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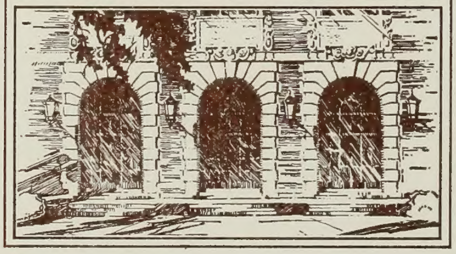

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Public Health Service
National Institutes of Health

JANUARY 1971
VOLUME 6, NO. 1
1–900

Volume 6, No. 1 Abstracts and Citations Nos. 1-900

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the

National Institute of Arthritis and Metabolic Diseases

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington D. C. 20402. Subscription price per year in the United States, Canada, and Mexico, $16.00; foreign, $4.00 additional; and $1.25 for a single copy. Payment is required in advance, and check or money order should be made payable to the Superintendent of Documents.

NOTE

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	min	minute(s)
ADP	adenosine diphosphate	ml	milliliter(s)
AMP	adenosine monophosphate	mm	millimeter(s)
ATP	adenosine triphosphate	MTD	maximum tolerated dose
BSP	sulfobromophthalein	NAD	nicotanamide adenine dinucleotide
C	degrees centigrade	NADH	reduced nicotinamide adenine dinucleotide
cm	centimeter(s)	NADP	nicotinamide adenine dinucleotide phosphate
CNS	central nervous system	NADPH	reduced nicotinamide adenine dinucleotide phosphate
cpm	counts per minute		
DNA	deoxyribonucleic acid	ng	nanogram (10^{-9})
e.g.	for example	pg	picogram (10^{-12})
g	gram(s)	p.o.	orally
µg	microgram(s)	ppm	parts per million
hr	hour(s)	r	Roentgen
i.m.	intramuscular	RBC	red blood cells (erythrocytes), red blood count
i.p.	intraperitoneal		
IU	international unit(s)	resp.	respectively
i.v.	intravenous	Rev.	review (only in citations)
kg	kilogram(s)	RNA	ribonucleic acid
LD$_{50}$	median lethal dose(s)	s.c.	subcutaneous
LDH	lactic acid dehydrogenase	sec	second(s)
m	meter(s)	SGOT	serum glutamic-oxalacetic transaminase
M	molar	SGPT	serum glutamic-pyruvic transaminase
mEq	milliequivalent(s)	U	unit(s)
mM	millimolar	UV	ultraviolet
µM	micromolar	WBC	white blood cells (leukocytes), white blood count
mC,µC	milli-,microcurie(s)		
mg	milligram(s)	yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

1 AN HISTOCHEMICAL STUDY OF THE NERVE SUPPLY TO THE DEVELOPING ALIMENTARY TRACT. (E.) Cantino, D. (U. Turin Dept. Human Anat., Italy). *Experientia* 26(7):766-767, 1970.

The differentiation of intrinsic nerve cells and the ingrowth of extrinsic nerve fibers were studied in the developing alimentary tract of the rat, rabbit, and chicken using Koelle's method for the demonstration of acetylcholinesterase activity. Vagal fibers (acetylcholinesterase positive) were found in the esophagus and stomach wall on the 13th day in rat and rabbit embryos, and at stage 24-25 in the chick. Koelle-positive nerve fibers spread from the celiac ganglion along the superior mesenteric artery to reach the duodenal wall, while positive fibers from the pelvic nerves reached the wall of the terminal intestine. The intensity of the Koelle reaction increased as a function of development. The ingrowth of Koelle-positive extrinsic nerve fibers and the differentiation of acetylcholinesterase-containing neurons in Auerbach's plexus followed a different pattern in mammals than in the chick.

2 SURFACE TOPOLOGY OF THE STOMACH IN MAN AND THE LABORATORY FERRET. (E.) Pfeiffer, C. J. (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia). *J. Ultrastruct. Res.* 33(3-4):252-262, 1970.

The ultrastructure of the surface of the stomach of normal ferrets and man was examined in fixed sections of tissue or by scanning electron microscope. Specimens were obtained from the gastric antrum and gastric body of ferrets and from or near the antrum of 2 men under treatment for marginal and duodenal ulcer. Cut specimens and larger vacuum-dried specimens revealed gastric pits in both man and ferrets, with some branching to separate glands in the ferret. Fewer cells were interspersed between the pits in the ferret. The convex surface, polygonal boundaries of the cells, and uniform surface covering with its microvilli were apparent at high magnification in both man and ferrets. Although precipitated strands, globules, or flakes of mucus were observed on the gastric surface and mucus sometimes obscured the microvilli, actual secretion of mucus by the surface epithelial cells could not be demonstrated.

3 CORRELATIVE IMMUNOCHEMICAL AND LIGHT MICROSCOPIC STUDIES OF THE GASTRIN CELL OF THE ANTRAL MUCOSA. (E.) McGuigan, J. E. (U. Florida Coll. Med., Gainesville) and M. H. Greider. *Gastroenterology* 60(2):223-236, 1971.

Gastrin-containing epithelial cells in sections of porcine pyloric antral mucosa did not stain with the alkaline diazonium procedure or any of 5 different silver staining procedures, nor did they exhibit a clear cytoplasm. These cells were stained and identified by immunochemical techniques using IgG-containing antibodies to human gastrin I labeled with fluorescein and horseradish peroxidase. Autofluorescent cells, located primarily in the deeper portions of the glands, were stained with the alkaline diazonium procedure and the silver impregnation techniques. The staining properties of these autofluorescent cells together with their size, shape, and location indicate that these cells include the argentaffin cells of the endocrine cell system in the gastrointestinal tract. Nonautofluorescent argyrophilic cells, a third type of endocrine-like cell, were also found in hog antral mucosa. These results indicate that endocrine cells of the gastrointestinal mucosa are too heterogeneous to be classified by previous methods.

4 THE PRENATAL AND POSTNATAL SIZE OF NUCLEI IN GUINEA PIG LIVER CELLS. (Ger.) Wüstenfeld, E. (U. Wurzburg Anat. Inst., Germany) and A. Rausch-Oertgen. *Z. Mikrosk. Anat. Forsch.* 82(3):367-384, 1970.

The diameter of liver cell nuclei was measured with an ocular micrometer in guinea pig embryos on the 30th to 65th day of gestation and in male guinea pigs 1 hr to 120 days after birth. Each liver lobule was divided into 3 segments of equal size: a central segment which surrounded the central vein; an intermediate segment; and a peripheral segment. In all 3 segments the diameter of liver cell nuclei increased from the 30th day of gestation until birth. This increase was continuous in the intermediate segment, but in the peripheral and central segments there were significant variations with minima on the 36th, 48th, and 63rd days of gestation. The mean diameter of all liver cell nuclei in embryonic guinea pigs was 5.78 µm. In guinea pig embryos no significant differences were found in the diameters of liver cells in the 3 segments examined. After birth the liver cell diameter continued to increase for 26 days. The mean diameter for the entire lobule was 6.31 µm or 9.2% larger than in the fetal livers. Significant differences in these diameters became evident in the 3 segments 5 days after birth. At all ages nuclei in the central segment had the largest mean diameters and those in the intermediate segment had the smallest.

5 THE CONNECTIVE TISSUES IN LIVERS OF CHILDREN. (E.) Ghosh, M. L. (Barnsley Hosp. Group, England) and J. L. Emery. *J. Clin. Pathol.* 23(7):599-603, 1970.

Microscopic analysis was made of tissue samples from the left and right lobes of livers of 200 children who had died of nonhepatic diseases, and the proportion of connective tissue to parenchymal tissue was determined. Until about 12 yr of age, the amount of connective tissue in the left lobe was about twice that in the right lobe, and the connective tissue content was considerably greater in infants than in adults. With increasing age, differences in the connective tissue content of the 2 lobes decreased until they became the same, as was seen for adults. The presence of relatively larger amounts of connective tissue in the left lobe is attributed to factors causing degenerative change of the left lobe in newborns. These include circulatory shock due to a sudden cutting off of placental blood flow through this lobe at birth. The importance of separate evaluation of the left and right lobes of the liver in children is emphasized. It is also suggested that such analysis be used to study cases of portal hypertension in conjunction with hepatic fibrosis and cystic disease.

6 NON-HOMOGENEOUS BUT PARALLEL DISTRIBUTION OF ESSENTIAL TRACE ELEMENTS IN MULTIPLE ADJACENT SAMPLES OF SINGLE LIVERS, MEASURED BY NEUTRON ACTIVATION ANALYSIS. (E.) Schicha, H. (Julich Nuclear Res. Plant Inst. Med., Germany), L. E. Feinendegen, K. Kasperek, H. J. Klein and V. Siller. *Beitr. Pathol. Anat.* 141(3):227-232, 1970.

The contents of Fe, P, Se, Zn, Co, and Sb were determined in different regions of livers from a 10-month-old infant and a 67-yr-old adult by neutron activation analysis. The contents of all these trace elements was 2-4 times higher in the adult than in the infant liver. Contents of the essential trace elements (Fe, P, Se, Zn, and Co) varied widely in different regions of the liver but showed a similar and almost parallel distribution pattern. This may be due to nonhomogeneous metabolism in various macroscopic portions of the liver. These findings suggest that there are local differences in the rate of synthesis and the content of nucleic acids and protein. The lower trace element content of the infant liver may be due to differences in the ploidy of the liver cell nuclei. The Sb content of the infant liver was so low that it could not be accurately measured, suggesting that this nonessential trace metal accumulates in the liver.

7 QUANTITATIVE STUDIES ON THE DISTRIBUTION OF GOBLET CELLS IN THE SMALL INTESTINE OF THE GUINEA PIG. (Ger.) Ludwig, A. (Friedrich Schiller U. Anat. Inst., Jena, Germany) and G. Geyer. *Z. Mikrosk. Anat. Forsch.* 82(3):362-366, 1970.

Examination of cross-sections of the small intestine of 10 male and female guinea pigs showed that goblet cells are evenly distributed in the villi and crypts, but the number of these cells significantly decreased from the bottom of the crypts to the upper end of the villi. In the villi the total number of goblet cells ranged from 6767 to 11,118 with a mean of 8946. In the villi goblet cells were most numerous in the first 1/3 of the small intestine and decreased in number toward the ileocecal valve. In the crypts the secreting surface of the goblet cells averaged 24,649 target points. This secreting surface increased with increasing distance from the stomach and reached a maximum in the prececal region. It is suggested that more mucus is needed in the distal segments of the guinea pig's small intestine because of increasing condensation of the intestinal contents. However, since goblet cells also secrete nonspecific esterase in the small intestine, but not in the large intestine, of the guinea pig, the function of these cells must involve more than the production and secretion of mucus.

8 QUANTITATIVE AND QUALITATIVE CHANGES OF STRUCTURE AND ULTRASTRUCTURE OF INTESTINAL EPITHELIA DURING INCUBATION IN VITRO. (E.) Plattner, H. (U. Innsbruck Inst. Electron Micr., Austria), J. Klima, A. Mehnert and H. Berger. *Virchows Arch.* [*Zellpathol.*] 6(4): 337-349, 1970.

On the basis of ultrastructural changes found in epithelial cells of the jejunum in everted sac preparations from male Sprague-Dawley rats, it is recommended that biochemical studies of intestinal absorption should limit incubation periods to 30 min or less. During the first 30 min of in vitro incubation the volume of these epithelial cells increased due to swelling. Cytoplasm, mitochondria, and nuclei swelled to about the same extent so that fluid absorption involves the cell as a whole rather than any particular cell components. Some signs of degeneration, which became evident about 30 min after incubation was begun, were partial disorganization of inner mitochondrial membranes, chromatin aggregation in the inner zones of the nuclei, deformation of dictyosomes, ribosomal disintegration, and partial disintegration of the cristae. After 3 hr of incubation cytolysis was far advanced, but basement membranes still remained intact.

9 HISTOGENETIC RELATIONSHIP BETWEEN CARCINOIDS AND MUCIN-SECRETING CARCINOMAS OF COLON AS REVEALED BY HETEROTRANSPLANTATION. (E.) Goldenberg, D. M. (Temple U. Sch. Med., Philadelphia, Pa.) and E. R. Fisher. *Br. J. Cancer* 24(3):610-614, 1970.

A carcinoid from the large intestine of a 67-yr-old woman was successfully transplanted into the cheek pouches of adult golden hamsters after 4-8 days of incubation in cell-impermeable chambers implanted i.p. in male and female Wistar rats. These tumors appeared to have a doubling time of about 3 days. No metastases have been observed in hamsters during the 4 yr propagation period.

Although no mucin-secreting cells were found in the original carcinoid, cheek-pouch transplants consisted only of signet-ring cells whose cytoplasm reacted intensely with mucin stains (periodic acid-Schiff and alcian blue) but failed to react with stains for enterochromaffin granules. The transplantable hamster tumor line, designated as GW-77, has histological features consistent with an adenocarcinoma. These findings suggest that carcinoids and adenocarcinomas are related and that mucin-secreting cells can develop from carcinoid cells.

10 THE EFFECT OF CORTICOTROPHINE AND CORTISONE ON THE CONTENT OF SIALIC ACIDS IN MUCOUS MEMBRANE OF RAT GASTROINTESTINAL TRACT. (E.) Kozłowska, K. (Med. Sch., Gdansk, Poland), K. Kilkowska and B. Zurawska-Czupa. *Endokrinologie* 56(3):319-324, 1970.

Administration of ACTH (5 i.p. injections of 25 mg each given every 2 hr) into sexually mature male Wistar rats increased the sialic acid content of the mucosa in the pyloric region of the stomach, the duodenum, and the colon; no change occurred in the gastric fundus. When 25 mg doses of cortisone acetate were administered in the same way, sialic acid decreased significantly in the gastric fundus and increased significantly in the pylorus, duodenum, and colon.

11 ULTRASTRUCTURAL AND BIOCHEMICAL CHANGES AFTER MARKED CAERULEIN STIMULATION OF THE EXOCRINE PANCREAS IN THE DOG. (E.) Tardini, A. (U. Parma Inst. Pathol. Anat., Italy), P. Anversa, C. Bordi, G. Bertaccini and M. Impicciatore. *Am. J. Pathol.* 62(1):35-56, 1971.

When infused into 5 anesthetized mongrel dogs, cerulein (20 ng/kg/min i.v. for 10-12 hr) first increased and then gradually decreased the amylase output and dry residue in pancreatic secretion; the volume of pancreatic juice and its bicarbonate remained constant during infusion. This action of cerulein was largely independent of systemic blood pressure values. Electron microscope examination of pancreatic biopsies from cerulein-treated dogs showed dilation of endoplasmic reticular cisternae, a marked decrease in the number of zymogen granules, and the presence of prozymogen granules and large vacuoles during the first few hr. Later during infusion autophagic vacuoles appeared, a sign of focal degeneration. Whorls of endoplasmic reticulum, which developed later, are thought to be related to cellular cytoplasmic regeneration. Mitochondrial changes which were more pronounced in experimental animals than in controls may have been artefacts of fixation or manifestations of mechanical damage. Most of the ultrastructural changes described above disappeared 12-24 hr after cerulein infusion was discontinued. These findings suggest that the prolonged enzyme secretion produced by cerulein results in the destruction of most cytoplasmic organelles and is followed by regeneration.

12 STUDIES ON HUMAN GASTRIC GEL MUCIN. ISOLATION AND CHARACTERIZATION OF A MAJOR GLYCOPROTEIN COMPONENT. (E.) Waldron-Edward, D. (McGill U. Dept. Surg. Biochem., Montreal, Canada) and S. C. Skoryna. *Gastroenterology* 59(5):671-692, 1970.

Purified gastric gel mucin was prepared from the gastric juice of human volunteers. On free-flow electrophoresis at pH 2.7 or 3.0 mucin separated into 1 major and 2 minor components, the maxima of which coincided in position with those of fucose and protein. The elution patterns of fucose and protein did not differ with blood group or secretor status; all samples contained some blood group-inhibitory activity. Gel filtration of Sephadex G-200 followed by elution from 1% agarose gel revealed that the major component of mucin has a molecular weight or particle size considerably greater than that of Blue Dextran (2×10^6). Further purification by paper electrophoresis demonstrated that 1 minor component has a molecular weight close to 2×10^6, a high carbohydrate content, and blood group activity. The second minor component has a molecular weight close to that of bovine serum albumin; its fucose content accounts for only 3% of that in unfractionated mucin. The molecular weight of the major component was confirmed and its composition and physical properties were found to be very similar to those of native mucin. Amino acid analysis of the major fraction showed that more than 1/3 of the total amino acid content was accounted for by threonine and serine; proline, glycine, and alanine were also relatively abundant.

13 THE ISOLATION AND PARTIAL CHARACTERISATION OF THE PRINCIPAL GASTRIC GLYCOPROTEIN OF 'VISIBLE' MUCUS. (E.) Schrager, J. (Roy. Albert Edward Infirm., Wigan, Lancashire, England) and M. D. G. Oates. *Digestion* 4(1):1-12, 1971.

The carbohydrate, sulfate, and N-acetylneuraminic acid contents and blood group specificity were determined on pooled samples of sediment and surface layers of mucus obtained by centrifugation of 50 individual gastric aspirates. This "visible" mucus was separated by column chromatography on Bio-gel P150. Two peaks resulted: (1) a nonretarded peak containing 69-95% of the glucosamine and 70-100% of the galactosamine and (2) a fraction consisting of polypeptides and the remaining carbohydrates. These results were similar to those obtained previously with the supernatant, but no pepsin fraction was found. Gastric glycoproteins had a galactose:glucosamine: galactosamine ratio of 4:3:1. Each sample had the same terminal sugar residues and a characteristic blood group specificity. Amino acid analysis showed that threonine and serine (in a 2:1 ratio) comprised 45-50% of the amino acid content; proline, alanine, and glycine accounted for another 30%; and no methionine was found. The total amino acid content of these glycoproteins was 12-19%. Distribution of glycoprotein between sediment and supernatant varied greatly with the pH of the gastric aspirates. Mucosal sediments of low acidity contained up to 72% of the total carbohydrate content, whereas at a neutral pH a semi-gel was often found. The presence of free sialic acid was related to pH, temperature, and time interval between collection and study of the aspirates; the sulfate content was not affected. The experimental conditions used in this study were unfavorable for studying the sialic acid content of gastric glycoproteins.

14 THE IMMUNOGLOBULIN CLASS OF AUTOANTIBODY-CONTAINING CELLS IN THE GASTRIC MUCOSA.

(E.) Baur, S. (Stanford U. Sch. Med., Calif.), N. Koo and K. B. Taylor. *Immunology* 19(6):891-894, 1970.

The immunoglobulin class of autoantibodies to intrinsic factor in cells of the gastric mucosa was investigated in 5 patients with pernicious anemia by combined immunofluorescence staining and autoradiography. Cells containing IgG antibody to intrinsic factor were found in 2 of 5 biopsies tested with antihuman IgG. One of the biopsies, from a patient with a high titer of circulating antibody to intrinsic factor, had so many grains in interstitial locations that one could not be certain that any collection of grains was overlying a specific cell by the present technique. No autoantibody-containing cell of the IgA immunoglobulin type was found in any of the biopsies. The IgA-containing cells were found primarily in the lamina propria between the gastric glands, while the IgG-containing cells were found predominantly in the lamina propria, deep to the glands, in the muscularis mucosa and in the submucosa. The mechanism of production of autoantibodies in the gastrointestinal tract may not be the same as that of antibody formation to ingested agents.

15 LOCALIZATION OF THE MONOGLYCERIDE PATHWAY IN SUBCELLULAR FRACTIONS OF RAT INTESTINAL MUCOSA.

(E.) Gallo, L. (George Washington U. Sch. Med., Washington, D. C.) and C. R. Treadwell. *Arch. Biochem. Biophys.* 141(2): 614-621, 1970.

By using the 2-octadecyl-(1-^{14}C)glyceryl ether, which does not undergo spontaneous isomerization, a comparison was made of glyceride synthesis in the brush border membrane and microsome fractions from the small intestine of male Wistar rats. Total monoglyceride and diglyceride transacylase activities were 3 times higher in the brush border fraction than in the microsomes, and the specific activities in the brush border fraction were 6-8 times higher. Lipid separation by thin-layer chromatography revealed that the brush border contributed about two-thirds of the total diglyceride and triglyceride analogs synthesized by the whole homogenate. Assessment of the purity of these fractions by biochemical markers showed that microsomal contamination of the brush border fraction could not account for triglyceride synthesis attributed to the brush border, but brush border contamination of the microsomal fraction could account for 30-100% of triglyceride synthesis attributed to the microsomal fraction. The high level of diglyceride synthesis found in the microsomal fraction, however, could not be explained by brush border contamination. Structural determinations demonstrated that both the brush border and microsome fractions synthesized 1,2-diglyceride, but since only a part of the diglyceride analog was converted to phosphatidic acid, it is possible that some 2,3-diglyceride was synthesized at either or both sites. The highest percentage of the original glyceryl ether was found in the brush border fraction.

16 SOME INVESTIGATIONS OF THE MECHANISM OF THE SO-CALLED "METHYLATION" REACTIONS USED IN MUCOSUBSTANCE HISTOCHEMISTRY. II. HISTOCHEMICAL DIFFERENTIATION OF LACTONE AND ESTER GROUPS IN "METHYLATED" MUCOSACCHARIDES.

(E.) Sorvari, T. E. (U. Turku Dept. Pathol. Anat., Finland) and P. J. Stoward. *Histochemie* 24(3):114-119, 1970.

Circumstantial evidence is presented to show that acid "methylating" reagents used in the histochemical study of mucins convert the anionic groups of acid mucosaccharides to a lactone instead of a methyl ester. These studies were made on mucin in the cartilage matrix, mast cells, lingual mucous glands, goblet cells of the colon and duodenum, mucous acini of the sublingual gland, and serous acini of the submaxillary gland of the hamster and on mucin in the mucous acini of the mouse sublingual gland. When these mucins were "methylated" at pH 3.5 for 4 hr with methanolic thionyl chloride, saponified, and "methylated" with 0.1-0.2 M aqueous solutions of sodium borohydride at 0C, mucins lost their basophilia which was not restored by subsequent saponification. More dilute solutions of sodium borohydride (0.001-0.01 M) had little effect on the basophilia of most mucins except for that in the mouse sublingual gland. After "methylation" with methanolic hydrogen chloride or hydrogen chloride in cyclohexane, basophilia was rapidly and completely blocked in hamster duodenal goblet cells and mouse sublingual glands and was reduced in colonic and sublingual hamster mucins by treatment with neutral hydroxylamine. Alkaline hydroxylamine inhibited restoration of basophilia in all the mucins studied, but control experiments indicate that this may be due to mucin hydrolysis or extraction. Neutral hydroxylamine had little effect on the basophilia of sections methylated with ethereal diazomethane but alkaline hydroxylamine blocked it completely. Basophilia could not be restored under any conditions to sections "methylated" in ethereal diazomethane, but basophilia was partially restored in sublingual gland mucins, colonic goblet cells, and mast cell granules "methylated" in other ways by "hydrolysis" at pH 9.5 for 2 hr; "hydrolysis" at pH 7.0 had no effect.

17 DISCONTINUOUS ELECTROPHORESIS OF PEPSIN AND PEPSINOGEN IN THIN SHEETS OF POLYACRYLAMIDE GEL. (E.) Cunningham, L. (Marquette Sch. Med., Milwaukee, Wis.), E. M. Rasch, A. L. Lewis and R. Heitsch. *J. Histochem. Cytochem.* 18(12):853-861, 1970.

Discrete protein bands were separated electrophoretically from solutions of crystalline pepsin or pepsinogen in a system incorporating pH discontinuity and using standard glass microslides to support thin (0.25 mm) sheets of 15% polyacrylamide gel. Adherence of gel films to a glass support during fixation and staining with crystal violet prevented distortion of gels as a result of swelling and provided preparations that could readily be scanned with a microspectrophotometer. A characteristic impurity, found in several samples of crystalline pepsinogen, had a mobility which was the same as that of pepsin subjected to electrophoresis under the same conditions. Minor contaminants were probably peptides of various molecular weights formed by autolysis of pepsin.

18 MORPHOMETRIC AND ULTRASTRUCTURAL STUDY OF CIRCADIAN VARIATIONS IN PARENCHYMAL CELLS OF THE RAT LIVER. (Ger.) Rohr, H. P. (U. Basel Pathol. Inst., Switzerland), A.-C. Hundstad, L. Bianchi and H. Eckert. *Acta Anat. (Basel)* 76(1):102-111, 1970.

A morphometric investigation of randomly-selected liver sections from 6 male Wistar rats indicates that circadian variations in the relative volume of cell organelles should be taken into consideration in short-term experimental investigations of liver damage. Liver sections were taken from 3 rats killed at noon and 3 killed at midnight, and the sections were fixed in OsO_4 buffered with 2,4,6-trimethylpyridine. At midnight the mean value for the relative volume of glycogen was only about half as large as that found at noon, but there was no significant differences in the mean volumes for the smooth endoplasmic reticulum. At midnight the mean values for the relative volume of the mitochondria and rough endoplasmic reticulum were significantly larger than at noon, suggesting that metabolic activity in parenchymal liver cells is greater at night. These results differ from others reported in the literature because of the use of different buffers, e.g. potassium phosphate which may obscure large parts of the smooth endoplasmic reticulum with electron-dense glycogen granules.

19 PROTEIN CONSTITUENTS OF MICROSOMAL MEMBRANES IN RAT LIVER CELLS. (Fr.) Pascaud, A. (Cancer Res. Inst., Villejuif, France), P. B. Auliac, J.-C. Ehrhart and M. Pascaud. *Biochim. Biophys. Acta* 219(2):339-348, 1970.

Rat liver microsomes were obtained from the livers of fasting male Wistar rats by fractional centrifugation of a 10% liver homogenate in 0.88M of sucrose. A "minimal" membrane fraction (density 1.08-1.10) was then isolated by treating microsomes with 0.26% deoxycholate and 0.14 mM of ethylenediamine tetraacetic acid in the presence of bentonite followed by gradient density centrifugation in sucrose. The protein in this fraction constitutes about 21% of all microsomal proteins and is associated with about twice its weight in lipids. Separation of these proteins by electrophoresis in acrylamide gel yielded 6 protein bands associated into 3 groups which constituted 44%, 8%, and 40%, resp., of the total membrane proteins. Molecular weight determinations made with protein markers by comparing migration in 5% and 10% acrylamide gels gave values of about 59,000 for the 3 group I proteins, 46,000 for the intermediate group II protein, and 25,000 for the 2 group III proteins.

20 PREPARATION AND CHARACTERIZATION OF GOLGI MEMBRANES FROM RAT LIVER. (E.) Fleischer, B. (Vanderbilt U. Dept. Molec. Biol., Nashville, Tenn.) and S. Fleischer. *Biochim. Biophys. Acta* 219(2):301-319, 1970.

Purified Golgi-rich membranes were isolated from rat liver by a zonal centrifugation method used previously to isolate these membranes from bovine liver. The activity of uridine diphosphate-galactose-N-acetylglucosamine galactosyl transferase in this fraction is about 100 times higher than that in the homogenate, and this enzyme appears to be a useful marker for Golgi apparatus. In Golgi membranes the activities of glucose-6-phosphatase, adenosine triphosphatase, and acid phosphatase were low and indicate that there is little contamination from other organelles. Thiamine pyrophosphatase was present in endoplasmic reticulum and plasma membranes as well as in Golgi membranes from rat liver, and was therefore not a useful marker. A comparison of rat liver and bovine liver Golgi membranes shows that the former contains little or no rotenone-insensitive NADH- or NADPH-cytochrome c reductase activity while the latter has significant amounts. In contrast to bovine liver preparations, rat liver Golgi membranes have a characteristic protein profile after electrophoresis in polyacrylamide gels which differs from that of endoplasmic reticulum, plasma membranes, and mitochondria. Both bovine and rat liver Golgi membranes have a major protein band which may be either serum albumin or serum lipoproteins with a very low density. A simplified one-step procedure was developed to obtain usable quantities of Golgi membrane from 3-4 g of liver. With this procedure the yield of Golgi protein was increased from 0.05 mg/g to 0.15-0.3 mg/g of liver.

21 AUTORADIOGRAPHIC STUDIES ON CELL POPULATION KINETICS IN DOG GASTRIC AND RECTAL MUCOSA. A COMPARISON BETWEEN IN VITRO AND IN VIVO METHODS. (E.) Willems, G. (Saint Pierre U. Hosp., Brussels, Belgium), P. Galand and J. Chretien. *Lab. Invest.* 23(6):635-639, 1970.

Determinations of the labeling index, S-phase duration, and turnover time in the fundic and rectal mucosa of 3 fasting adult dogs were made autoradiographically in biopsies taken before and 1/2-14 hr after in vivo labeling with ^{3}H-thymidine i.v. and in biopsies doubly labeled in vitro with different concentrations of ^{3}H-thymidine. Labeling indices determined by these 2 methods were almost identical and values for the S-phase duration agreed fairly well. By using in vitro labeling it is possible to make repeated determinations of turnover time in the same experimental animal. This technique is recommended as a method of choice in clinical investigations because of its low cost, technical simplicity, and complete safety.

22 INNERVATION OF THE CANINE SUBMAXILLARY GLAND. (Rus.) Maevskii, V. E. (Gorki Med. Inst., Donetsk, USSR). *Fiziol. Zh. SSSR* 56(10):1483-1489, 1970.

23 AUTONOMIC REGULATION OF POSTNATAL CHANGES IN CELL NUMBER AND SIZE OF RAT PAROTID. (E.) Schneyer, C. A. (U. Alabama Med. Ctr., Birmingham) and H. D. Hall. *Am. J. Physiol.* 219(5):1268-1272, 1970.

24 FUNDAL GLAND CELLS DURING PROLONGED ACTION OF HISTAMINE. (Rus.) Fisher, A. A. (Med. Inst., Stavropol, USSR), Z. K. Lopunova and V. V. Gresev. *Biull. Eksp. Biol. Med.* 70(11): 53-55, 1970.

25 SYNAPTIC CONNECTIONS OF THE VAGAL FIBERS IN THE MYOENTERIC PLEXUS. (It.) Filogamo, G. (U. Turin Inst. Human Anat., Italy) and G. Gabella. *Boll. Soc. Ital. Biol. Sper.* 46(5):209-210, 1970.

26 DIFFERENCES IN SURVIVAL OF JEJUNAL CRYPT CELLS AFTER RADIATION DELIVERED AT DIFFERENT DOSE RATE. (E.) Hornsey, S. (Hammersmith Hosp., London). *Br. J. Radiol.* 43(515):802-806, 1970.

27 EFFECTS OF DIETARY PROTEINS OR CERTAIN AMINO ACIDS (SULFATED AMINO ACIDS OR VALINE) ON THE MORPHOLOGY OF LYMPHOCYTES IN RAT INTESTINAL MUCOSA. (Fr.) Aschkenasy, A. (CNRS Lab. Hematol. Nutr., Orleans, France) and M. J. Cao. *J. Physiol. (Paris)* 62(Suppl. 2):236, 1970.

28 THE RESPONSE OF STEM CELLS OF INTESTINAL MUCOSA TO IRRADIATION WITH 14 MeV NEUTRONS. (E.) Whithers, H. R. (U. Texas Sect. Exp. Radiother., Houston), J. T. Brennan and M. M. Elkind. *Br. J. Radiol.* 43(515): 796-801, 1970.

29 MORPHOLOGICAL AND HISTOCHEMICAL CHANGES IN THE LIVER AND KIDNEYS OF RATS EXPOSED TO LONG-TERM HYPOTHERMIA. (Rus.) Starostin, V. I. and L. A. Karaseva. *Kosm. Biol. Med. (Mosk.)* 4(4):29-34, 1970.

30 RESPONSE OF THE GALLBLADDER WALL TO INJECTION OF A FOREIGN BODY. (Rus.) Dyban, P. A. (Inst. Exp. Med., Leningrad, USSR). *Arkh. Anat. Gistol. Embriol.* 59(9):27-36, 1970.

31 DIFFERENTIATION OF THE GALLBLADDER EPITHELIUM DURING DEVELOPMENT OF Gallus gallus. (It.) Nesci, E. (U. Palermo Inst. Human Anat., Italy) and D. Palermo. *Boll. Soc. Ital. Biol. Sper.* 46(5):264-265, 1970.

32 SIMULTANEOUS EVALUATION OF TISSUE HEPARIN AND MAST CELLS IN SMALL TISSUE SAMPLES. (E.) Jaques, L. B. (U. Saskatchewan Dept. Physiol., Saskatoon, Canada) and A. K. Debnath. *Am. J. Physiol.* 219(5): 1155-1160, 1970.

See also numbers: 45, 64, 172, 173, 200, 202, 230, 390

33 IONIC FLUX ACROSS THE GASTRIC MUCOSA: EFFECTS OF ATROPINE ON THE PERMEABILITY OF FUNDUS AND ANTRUM. (E.) Rudick, J. (City U. New York Mt. Sinai Sch. Med., N. Y.), J. L. Werther, M. L. Chapman and H. D. Janowitz. *Proc. Soc. Exp. Biol. Med.* 135(3):605-608, 1970.

Measurements were made of the movements of ions across the fundic and antral mucosa in mongrel dogs with vagally denervated fundic and antral pouches during instillation of atropine sulfate (0.05 mg/kg i.v.). Solutions of 0.16 N HCl were instilled into the pouches at 30 min intervals. Atropine increased the loss of H^+ in both pouches, but to a somewhat greater extent in the fundus (86%) than in the antrum (66%). It is unlikely that this loss of H^+ is due to buffering of H^+ by HCO_3^- from nonparietal secretion, since this would result in evolution of carbon dioxide and a greater reduction in osmolality than was actually observed. The effects of atropine on gastric acid secretion appear to be due both to the blocking of postganglionic cholinergic fibers and, to a lesser extent, to transmucosal loss of H^+.

34 THE EFFECT OF BILE ON ELECTROLYTE MOVEMENT ACROSS CANINE GASTRIC ANTRAL AND FUNDIC MUCOSA. (E.) Werther, J. L. (Mt. Sinai Sch. Med., New York, N. Y.), H. D. Janowitz, W. P. Dyck, M. L. Chapman and J. Rudick. *Gastroenterology* 59(5):691-697, 1970.

The effects of human hepatic and canine bile on ion fluxes was studied in vagally denervated fundic and antral pouches in healthy mongrel dogs. Na^+, K^+, Cl^-, phenol red, and osmolality were determined in 0.160 N HCl instilled into these pouches before and after 30 min exposure to bile. In both types of pouches the net flux of Na^+, K^+, and H^+ increased markedly after exposure to bile at relatively low concentrations (8.7-9.4 mM bile salts in the human bile). In antral pouches H^+ losses increased 2.4-3.5-fold and the rate of Na^+ entry increased 1.4-1.7-fold while K^+ entry increased only slightly. Fundic pouches were less permeable than antral pouches to these ions during control periods, but after bile exposure H^+ losses increased 1.9-5.2-fold, the rate of K^+ entry increased 4.6-10.8 times, and the rate of Na^+ entry was 1.7-5.4 times greater than during the control period. These increases in net ionic fluxes were rapidly reversible. Results were the same with native and heated bile, ruling out the possibility that the effect of bile might be due to enzymes of bacterial or other origin. These results indicate that despite the greater permeability of normal mucosa in the pyloric gland area, a barrier to ionic diffusion exists in this area and it is impaired by exposure to bile.

35 EFFECT OF BILE SALTS ON IONIC MOVEMENT ACROSS THE HUMAN GASTRIC MUCOSA. (E.) Ivey, K. J., L. DenBesten (Univ. Hosp., Iowa City, Iowa) and J. A. Clifton. *Gastroenterology* 59(5):683-690, 1970.

Serial instillation of bile salts (200 ml of 5.0-5.5 mM in hydrochloric acid) was studied in the gastric mucosa of 9 normal subjects. In 5 subjects a bile salt mixture (84% taurocholic acid, 14% taurodeoxycholic acid and 2% taurochenodeoxycholic acid) produced a significant H^+ loss from the lumen and significantly increased net movement of Na^+, Cl^-, and K^+ into the lumen. Osmolality and H^+ and Cl^- concentrations were significantly lower than control values, while Na^+ and K^+ concentrations were significantly higher. Volumes of gastric secretion and gastric emptying in control and bile salt studies were not significantly different. In 3 subjects, taurocholic acid alone produced greater ionic flux changes than taurodeoxycholic acid alone. These results demonstrate that bile salts in the stomach increase the movement of H^+ and Cl^- out of the lumen.

36 NON-FERRITIN IRON COMPOUND IN RAT SMALL INTESTINAL MUCOSA DURING IRON ABSORPTION. (E.) Worwood, M. (Welsh Natl. Sch. Med., Cardiff), A. Edwards and A. Jacobs. *Nature (Lond.)* 229(5284):409-410, 1971.

Experiments performed on male Wistar rats confirmed that 2 iron compounds are present in the small intestinal mucosa after p.o. administration of ^{59}Fe-labeled ferric chloride. Increasing amounts of ^{59}Fe-labeled ferritin were found between 15 min and 4 hr after administration of ^{59}Fe. In addition, starch gel electrophoresis revealed the presence of a nondialyzable ^{59}Fe-containing substance with a low electrophoretic mobility. There was a significant correlation between the percentage of this iron compound and mean ^{59}Fe absorption, but not between the percentage of the iron compound and the interval between ^{59}Fe administration and removal of the intestine. During the first 4 hr after p.o. administration of ^{59}Fe, the relation between ^{59}Fe absorption and time interval is variable and largely dependent upon intestinal mobility. These results suggest that ^{59}Fe uptake by intestinal epithelial cells during the early phase of iron absorption is characterized by the appearance of a high molecular weight non-ferritin compound in the cells. An intracellular protein carrier may be involved in the transfer of iron across the intestinal cell during the rapid phase of absorption.

37 INTERFERENCE OF IRON WITH THE ABSORPTION OF TETRACYCLINES IN MAN. (E.) Neuvonen, P. J. (U. Helsinki Dept. Pharmacol., Finland), G. Gothoni, R. Hackman and K. af Björksten. *Br. Med. J.* 4(5734):532-534, 1970.

Ingestion of 200 mg of ferrous sulfate significantly reduced serum levels of tetracycline, oxytetracycline, methacycline, and doxycycline in healthy volunteers, aged 20-24 yr, who had fasted overnight. Antibiotics were administered p.o. in doses of 500 mg (tetracycline and oxytetracycline), 300 mg (methacycline), or 200 mg (doxycycline) simultaneously with ferrous sulfate. To avoid inadequate blood levels and therapeutic failures, tetracyclines should not be given simultaneously with any preparation liberating ferric or ferrous ions in the upper gastrointestinal tract.

38 THE ROLE OF PARATHYROID HORMONE IN THE GASTRO-INTESTINAL ABSORPTION OF CALCIUM. (E.) Wills, M. R. (Roy. Free Hosp., London), J. Wortsman, C. Y. C. Pak and F. C. Bartter. *Clin. Sci.* 39(1):89-94, 1970.

Gastrointestinal calcium absorption was measured in 6 normal subjects and 1 patient with idiopathic hypoparathyroidism after p.o. or i.v. administration of ^{47}Ca. Determinations were made before and after i.m. injection of parathyroid hormone. Parathyroid hormone increased serum calcium and urinary calcium and phosphorus excretion while serum phosphorus levels varied; serum phosphorus values were significantly reduced in the patient with idiopathic hypoparathyroidism. After administration of parathyroid hormone significant increases occurred in calcium absorption, but these increases were smaller than those in urinary calcium excretion. These results indicate that parathyroid hormone plays a small but significant role in enhancing gastrointestinal absorption of calcium in man.

39 STIMULATION BY ARTIFICIAL LIGHTING OF CALCIUM ABSORPTION IN ELDERLY HUMAN SUBJECTS. (E.) Neer, R. M. (Massachusetts Gen. Hosp., Boston), T. R. A. Davis, A. Walcott, S. Koski, P. Schepis, I. Taylor, L. Thorington and R. J. Wurtman. *Nature (Lond.)* 229(5282):255-257, 1971.

Studies of 18 white males, aged 57-80 yr, suggest that illumination which simulates natural lighting significantly increases the efficiency of intestinal calcium absorption in subjects who are not exposed to UV radiation from the sun. Calcium intake was normal (500-100 mg/day) and vitamin D intake did not exceed 200 IU/day. ^{47}Ca absorption, determined from fecal ^{47}Ca after p.o. loading with ^{47}CaCl$_2$, was significantly higher in men exposed to "Vita-Lite" in UV-reflective fixtures (500 foot-candles for 8 hr/day) than in controls exposed to low levels of ambient lighting (30-50 foot-candles). Evidence was also obtained that, at least among individuals exposed to little sunlight, there is seasonal variation in calcium absorption and perhaps in vitamin D synthesis.

40 APPARENT INCREASE IN CARRIER AFFINITY FOR INTESTINAL CALCIUM TRANSPORT FOLLOWING DIETARY CALCIUM RESTRICTION. (E.) Walling, M. W. (Harvard Med. Sch., Boston, Mass.) and S. S. Rothman. *J. Biol. Chem.* 245(19): 5007-5011, 1970.

Several models are suggested to explain the increased active transport of Ca^{++} across the intestine in male Holtzmann rats fed a Ca^{++}-deficient diet. Kinetics of the transport system indicate that the increased transport of absorptive Ca^{++} results from a greater carrier affinity rather than from an increase in capacity or in maximum velocity of the transport process. The various models suggest that a second molecule (CaBP, a Ca^{++}-binding protein) alters the equilibrium of carrier/substrate and increases access of substrate. Examination of the transport system characteristics (bidirectional transmural fluxes of Ca^{++} across the duodenum) in conjunction with Michaelis-Menten kinetic models, and of the levels of CaBP under such restricted conditions, support the theory that a CaBP functions in the changes of Ca^{++} transport during dietary Ca^{++} deficiency.

41 THE EFFECT OF HYDROCHLOROTHIAZIDE ON CALCIUM AND STRONTIUM TRANSPORT IN INTESTINE AND KIDNEY. (E.) Donath, A. (U. Bern Pediat. Clin., Switzerland), S. Nordio, F. Macagno and R. Gatti. *Helv. Paediatr. Acta* 25(3):293-300, 1970.

Hydrochlorothiazide (2 mg/day p.o.) markedly decreased calciuria and definitely increased fecal calcium in 5 children without disorders in calcium metabolism. Following i.v. ^{47}Ca injection fecal calcium excretion remained unchanged. ^{85}Sr intestinal absorption was reduced (52.4 to 38.8%) by hydrochlorothiazide. As prolonged treatment with hydrochlorothiazide reduced calciuria in a child with primary hypercalciuria but corrected neither the osteoporosis not the growth retardation, the effect on calciuria may be only secondary to a reduction of calcium absorption from the intestine. The above effect may be an interesting in vivo test for evaluating the mechanism regulating calcium transport.

42 STUDIES ON INHIBITION OF INTESTINAL ABSORPTION OF RADIOACTIVE STRONTIUM: IX. RELATIONSHIP BETWEEN BIOLOGICAL ACTIVITY AND ELECTRON MICROSCOPIC APPEARANCE OF ALGINIC ACID COMPONENTS. (E.) Tanaka, Y. (McGill U., Montreal, Quebec, Canada), S. Inoue and S. C. Skoryna. *Can. Med. Assoc. J.* 103(5):484-486, 1970.

Sodium alginate from Laminaria hyperborea, which inhibits intestinal absorption of strontium, was partially hydrolyzed with oxalic acid and its decomposition products were fractionated into polymannuronate and polyguluronate fractions. Biological assays in rats by the intubation technique showed that polyguluronate inhibited strontium absorption in the intestine more effectively than polymannuronate or alginate. Electron micrographs revealed that both sodium polyguluronate and sodium polymannuronate consisted of microfibrils 45 Å in diameter, sodium polymannuronate retained the original helical structure of alginate while polyguluronate had a strong tendency to form large granules when these substances were dried from aqueous solutions. The greater degree of uncoiling in sodium polyguluronate makes more carboxylate ions available for strontium binding.

43 HISTOLOGICAL CHANGES IN THE SMALL INTESTINE OF THE YOUNG PIG AND THEIR RELATION TO MACROMOLECULAR UPTAKE. (E.) Clarke, R. M. (Med. Sch., University Park, Nottingham, England) and R. N. Hardy. *J. Anat.* 108(1):63-77, 1971.

Measurements of the uptake of ^{131}I-labeled polyvinylpyrrolidone (PVP) with a mean molecular weight of 160,000 in the small intestine of suckled piglets, aged 9 hr to 24 days, revealed that some animals were capable of absorbing PVP for up to 12 days after birth while in others the PVP uptake decreased at a much earlier age. These differences in PVP uptake were consistently related to the histological appearance of the small intestine. There was a positive correlation between the ability of an intestinal segment to take up PVP and the presence of vacuolated cells in the villous epithelium of that segment. In animals which retained their ability to absorb PVP, the PVP uptake was relatively uniform throughout the small intestine, with the exception of the 2 extremities, in younger animals. Until 6 days after birth the total uptake remained constant but gradually became restricted to the terminal 1/2-1/3. By age 13.5 days the total PVP uptake decreased.

44 THE INHIBITION OF INTESTINAL ABSORPTION OF PHENYLALANINE IN THE RHESUS MONKEY. (E.) Lines, D. R. (U. Wisconsin Med. Ctr., Madison) and H. A. Waisman. *Proc. Soc. Exp. Biol. Med.* 135(3):849-863, 1970.

Experiments performed on 4 normal adult male rhesus monkeys (Macaca mulatta) demonstrated that the phenylalanine antagonists cycloleucine and p-chlorophenylalanine strongly inhibited and β-2-thienylalanine partially inhibited intestinal absorption of phenylalanine. Monkeys were given oral loads of phenylalanine (750 mg/kg), either alone or in combination with β-2-thienylalanine (187.5 mg/kg), cycloleucine (225 mg/kg), or p-chlorophenylalanine (225 mg/kg). Serum tryptophan levels were reduced significantly after phenylalanine loading by all 3 antagonists, serum tryptophan levels were reduced significantly by cycloleucine and p-chlorophenylalanine, and serum tyrosine levels were not affected. Urinary phenylalanine excretion was reduced by cycloleucine and p-chlorophenylalanine but was promoted by β-2-thienylalanine. The possibility of using phenylalanine antagonists in diet therapy for children with phenylketonuria is discussed.

45 INTESTINAL FAT TRANSPORT DURING INHIBITION OF PROTEIN SYNTHESIS. AN ELECTRON MICROSCOPIC STUDY. (E.) Allen, C. H., P. S. Gibbs and R. A. Jersild, Jr. (Indiana U. Med. Ctr., Indianapolis). *Exp. Molec. Pathol.* 14(1):90-102, 1971.

Intestinal fat transport and chylomicron formation were studied in rats treated with inhibitors of protein synthesis: puromycin dihydrochloride (total dose of 15 mg/rat i.p. over an 8 hr period), dl-ethionine (1 mg/g body weight i.p. in 2 equal doses 1 hr apart), and cycloheximide (3 mg/100 g body weight i.p.). Although puromycin- and ethionine-treated rats exhibited a significant decrease in protein synthesis, there was no evidence of cellular damage or an abnormal pattern of fat transport as judged from intestinal absorptive cells. Chylomicrons were consistently present in large numbers in extracellular spaces of the epithelium and lamina propria. Cycloheximide produced similar results; however, some cellular alterations were observed. Both absorptive and goblet cells contained prominent inclusion bodies resembling autophagic vacuoles in the apical cytoplasm, often near the Golgi apparatus.

46 GALACTOSE TRANSPORT ACROSS THE HAMSTER SMALL INTESTINE; THE EFFECT OF SODIUM ELECTROCHEMICAL POTENTIAL GRADIENTS. (E.) Smulders, A. P. (U. California Med. Ctr., Los Angeles) and E. M. Wright. *J. Physiol. (Lond.)* 212(1):277-286, 1970.

Measurements of galactose unidirectional fluxes across the isolated mucosa of the hamster small intestine demonstrated that active galactose transport was irreversibly inhibited by reducing the Na$^+$ concentration in the mucosal and/or serosal solutions from 144 to 25 mEq/liter or by increasing the potential gradient across the epithelium to +40 mV. Contrary to expectations, galactose transport was not enhanced by decreasing the serosal Na$^+$ concentration to 25 mEq/liter or by clamping the tissue at -40 mV. Lowering the serosal Na$^+$ concentration actually reduced the net transport of galactose. It has been proposed that energy for the active transport of sugars is obtained from the difference in the sodium electrochemical potential energy between the intestinal lumen and the cell. These findings would fit this hypothesis if it were assumed that exposure of the cell to low external Na$^+$ concentrations inhibits metabolism and that the effective resistance of the serosal membrane is much greater than that of the brush border membrane. However, it is also possible that there are additional or alternative sources of energy for sugar transport, e.g. a Na^+-dependent adenosine triphosphatase in the brush border membrane.

47 THE EFFECT OF PANTOYLTAURINE ON GLUCOSE ABSORPTION IN THE INTESTINE. (Fr.) Huan, P. H. (Sorbonne Fac. Sci., Paris) and L. V. Hung. *C. R. Soc. Biol. (Paris)* 164(2):284-286, 1970.

Pantoyltaurine, a pantothenic acid antagonist, inhibited glucose absorption in Wistar rats with permanent and temporary Thiry-Vella loops. In rats with temporary loops glucose absorption was inhibited immediately by 20% when the intestine was perfused with a solution containing pantoyltaurine. Inhibition was abolished when the perfusing fluid contained both pantoyltaurine and pantothenic acid (concentrations not specified), indicating that pantothenic acid has a greater affinity for the transport system than pantoyltaurine. However, pantothenic acid did not abolish inhibition of glucose absorption when the intestine was first perfused with a pantoyltaurine solution for 2 hr. In rats with permanent Thiry-Vella loops the inhibiting effect of pantoyltaurine persisted for several weeks.

48 THE EFFECTS OF NORMOBARIC AND HYPERBARIC HYPERCAPNIA ON INTESTINAL GLUCOSE ABSORPTION AND ON SOME FEATURES OF CARBOHYDRATE AND PROTEIN METABOLISM IN THE RAT. (Fr.) Pérès, G. (M. Pacha Inst., Tamaris-sur-Mer, France), P. Maggi, F. Brue and R. Ricci. *C. R. Soc. Biol. (Paris)* 164(4):828-831, 1970.

In rats intestinal absorption of glucose from an isotonic solution was inhibited in vivo by a mixture of gas containing 10% carbon dioxide, 69% nitrogen, and 21% oxygen. It is possible that the decrease in intestinal tonus and motility induced by carbon dioxide is one of the causes of this inhibition, but another important factor is inhibition of cellular metabolism by carbon dioxide. This inhibition was partially suppressed by a mixture of 90% oxygen and 10% carbon dioxide. The antagonism between oxygen and carbon dioxide is probably due to a direct action on the fundamental mechanisms of glucose transport. Hypercapnia also caused an increase in the hematocrit and a decrease in blood lactic acid and plasma urea levels associated with an increase in α-amino nitrogen. Decreased lactic acid levels are caused by a decrease in pH. Increases in plasma α-amino nitrogen and decreases in plasma urea levels show that deamination and urea formation, in which hormones from the adrenal cortex play a very important role, are inhibited.

49 FOLATE METABOLISM IN NEWBORNS AND DURING EARLY INFANCY. I. ABSORPTION OF PTEROYLGLUTAMIC (FOLIC) ACID IN NEWBORNS. (E.) Shojania, A. M. (St. Boniface Gen. Hosp., Winnipeg, Manitoba, Canada) and G. Hornady. *Pediatr. Res.* 4(5):412-421, 1970.

Studies of folic acid absorption, made in 3-12-day-old infants and in normal adults, indicate that newborns absorb folate administered p.o. more slowly than adults, but the net absorption is comparable to that observed in adults. Serum and urinary folate were determined by microbiological assays with Lactobacillus casei and Streptococcus faecalis at various intervals after p.o. administration of folic acid (40 μg/kg) with or without prior folic acid loading. In newborns the folic acid absorption curves were much lower than those found in adults, even after prior p.o. loading or i.m. administration of folic acid. However, the folate absorption curve of newborns was comparable to that of unloaded adults when folic acid was injected i.m. after loading. After p.o. administration of folic acid newborns excreted a much smaller percentage of the administered dose in their urine than the adults. However, when newborns were first loaded with folic acid, urinary excretion of folate was comparable to that of unloaded adults. In newborns the daily elevation of serum folate after 40 μg/kg/day of folic acid p.o. was comparable to that obtained after 30 μg/kg/day of folic acid i.m. These data indicate that plasma clearance of folate in newborns is more rapid than that in adults and that large saturating doses of folic acid are needed to reduce this clearance rate. The differences between folate absorption curves in adults and newborns could also be explained by impaired absorption of folic acid in the jejunum of the newborns with compensatory absorption of folate in the ileum, but no evidence was obtained to support this hypothesis.

50 THE EFFECT OF CALCIUM IONS ON LONG CHAIN FATTY ACID TRANSPORT BY SLICES OF RAT JEJUNUM. (E.) Munday, K. A. (U. Southampton Dept. Physiol. Biochem., Hampshire, England), B. J. Parsons and D. A. York. *J. Physiol. (Lond.)* 211(3):517-526, 1970.

Triglyceride synthesis and the uptake of a palmitic acid-albumin complex and of palmitic acid emulsified in Tween 80 was studied in slices of everted jejunum from male Hooded Lister rats in the presence and absence of Ca^{++} in the incubation medium. At both 37C and 0C the palmitic acid uptake increased significantly when rat jejunum slices were incubated in medium containing 1.7 mM of Ca^{++}. It is unlikely that this increase is due to changes in the tissue extracellular space or to calcium-induced changes in the fatty acid-albumin complex, rendering the fatty acid more available for intestinal uptake. Triglyceride synthesis from absorbed fatty acid was not affected by the presence or absence of Ca^{++}, but Ca^{++} did increase release of triglyceride from the tissue. The large increases in intracellular fatty acid which occur in the presence of Ca^{++} suggest that triglyceride synthesis is the rate-limiting step, but it is also possible that increased palmitic acid absorbed in the presence of Ca^{++} may not be available for triglyceride synthesis. Increased release of triglyceride in the presence of Ca^{++} cannot be explained by loss of mucosal epithelial cells into the medium since this would be expected to be more pronounced in the absence of Ca^{++}. It seems more likely that triglyceride release from the mucosal cells occurs by reverse pinocytosis with Ca^{++} functioning as a bridge between the chylomicrons or the β-lipoprotein carrier and the cell membrane.

51 THE EFFECT OF DICUMAROL ON THE ACTIVE TRANSPORT, DIFFUSION, AND OXYGEN CONSUMPTION OF INTESTINAL SACS. (E.) Anselmi, E. (U. Navarra Dept. Anim. Physiol., Pamplona, Spain), R. Jordana and J. Larralde. *Rev. Esp. Fisiol.* 26(4):325-330, 1970.

In vitro studies performed with everted sacs prepared from the middle part of the small intestine of fasted Wistar rats demonstrated that dicoumarol (10^{-5}M and 5 x 10^{-5}M), when added to the mucosal fluid, significantly inhibits active transport of galactose from the mucosal to the serosal fluid and inhibits oxygen uptake in the tissue. Active galactose transport was also inhibited by preincubation of the preparations for 30 min with dicoumarol (5 x 10^{-5}M), even when no dicoumarol was present in the mucosal fluid. Dicoumarol had no effect on galactose transfer when it was initially present only in the serosal fluid. When dicoumarol (5 x 10^{-5}M) was present in the mucosal fluid, arabinose transfer from the mucosal to the serosal fluid increased 70%. Dicoumarol had no effect on urea transfer.

52 THE RELATION BETWEEN L-METHIONINE UPTAKE AND SODIUM IN RAT SMALL INTESTINE IN VITRO. (E.) Newey, H. (U. Sheffield Dept. Physiol., England), A. J. Rampone and D. H. Smyth. *J. Physiol. (Lond.)* 211(3):539-549, 1970.

L-Methionine and mannitol uptakes were measured in vitro in homogenates from everted sac preparations from the jejunum of male Sheffield rats after 30 min preincubation in solutions with different Na^+ concentrations. Then the intestine was immersed in saline solutions containing either 1 mM of [Me-^{14}C]L-methionine or 1 mM of [1-^{14}C]D-mannitol for 5-120 sec. While mannitol uptakes were not influenced much by the presence or absence of Na^+ or K^+, the initial stage in methionine uptake was dependent on the presence of Na^+ and, to a lesser extent, on the K^+ concentration. Depending upon the K^+ concentration, 30-60% of the initial methionine uptake was recovered within 5 sec by immersing the Na^+-deficient intestine into a saline solution containing Na^+. The initial methionine uptake was greater when the intracellular Na^+ concentration was normal and the Na^+ concentration of the medium was low than when the Na^+ concentration of the medium was high and the intracellular Na^+ concentration was low. This suggests that the intracellular Na^+ concentration is more important than the Na^+ gradient in determining the rate of amino acid transfer across the luminal membrane.

53 SODIUM-DEPENDENT BINDING OF L-HISTIDINE TO A FRACTION OF MUCOSAL BRUSH BORDERS FROM HAMSTER JEJUNUM. (E.) Faust, R. G. (U. North Carolina Sch. Med., Chapel Hill), M. J. Burns and D. W. Misch. *Biochim. Biophys. Acta* 219(2):507-511, 1970.

Epithelial brush border membranes were isolated from the jejunum of 6 hamsters, disrupted by incubation with distilled water or a sodium phosphate buffer, and subjected to gradient density centrifugation in Ficoll, a sucrose polymer. Only fraction I, the top band which floated on a 10% Ficoll layer, preferentially bound the actively transported ^{14}C-labeled amino acids, L-alanine, L-proline, and L-histidine. Preferential binding of L-histidine was shown to be dependent on the Na^+ concentration in the incubation mixture and did not occur when Na^+ was replaced with NH_4^+ or Li^+. Replacement of Na^+ by K^+ resulted in an 81% reduction in the preferential binding of L-histidine. These findings support the hypothesis that preferential binding of actively transported amino acids to a component within mucosal brush borders may be related to the initial step in the mechanism of active amino acid transport by the small intestine. Electron micrographs of fraction I showed vesicles and filaments resembling microvillus core material.

54 THE TRANSPORT OF PTEROYLGLUTAMIC ACID ACROSS THE SMALL INTESTINE OF THE RAT. (E.) Smith, M. E. (U. Aston Dept. Biol. Sci., Birmingham, England), A. J. Matty and J. A. Blair. *Biochim. Biophys. Acta* 219(1):37-46, 1970.

The transport and metabolic fate of pteroylglutamic acid (PGA; folic acid) in the small intestine was studied using ^{3}H-pteroylglutamic acid and everted sacs of male rat jejunum. PGA was transported at similar rates by sacs prepared from proximal portions of the small intestine (7-70 cm from the pylorus), but sacs from more distal regions transported it more slowly. Varying the concentration of PGA on the mucosal side of the sac (10^{-7}-10^{-6} M) proved the existence of a saturatable process in the jejunum. PGA was not actively transported to the serosal side against an electrochemical gradient with no initial concentration of PGA on the mucosal side. Glucose stimulated PGA transport when there were 10^{-6} M of PGA on the mucosal side, but even in the absence of glucose PGA transport was appreciable. At a concentration of 10^{-6} M, PGA transport varied with pH, the optimum pH being 6.0. It appears that PGA is transported by passive diffusion and solvent drag with water flow when 10^{-6} M are initially present on the mucosal side of the sac.

55 CHARACTERISTICS OF INTESTINAL TRANSPORT IN THE GUINEA PIG: BICARBONATE "SECRETION" AND FLUID TRANSPORT IN THE SMALL INTESTINE. (Ger.) Vogel, G. (Madaus Biol. Inst., Cologne (Merheim), Germany), H. Passmann and E. Meyering. *Pfleugers Arch.* 321(3):259-273, 1970.

In experiments performed on phenobarbital-anesthetized male and female guinea pigs, empty loops of the proximal jejunum and proximal ileum filled up with relatively large quantities of fluid after 120 min. In the jejunum the osmolarity of this fluid slightly exceeded that of plasma while in the ileum it was the same as in the plasma. Na^+ concentrations in the jejunum and ileum were almost identical with that in plasma while the HCO_3^- concentrations were about 5 times higher. Cl^- concentrations were only about 1/2 of the plasma value and urea concentrations differed only slightly. While K^+ concentrations in the jejunum only slightly exceeded plasma values, those in the ileum were almost twice as high. Ca^{++} concentrations in both segments of the intestine were lower than plasma Ca^{++} levels. These results indicate that isosmotic fluid transport occurs in both segments of the intestine with an "uphill" transport of HCO_3^- against a steep concentration gradient. When 3 ml of jejunal fluid were instilled into the cecum, no consistent results were obtained, but when jejunal fluid was instilled into the colon, isotonic absorption of water and solutes occurred in all cases. During absorption the HCO_3^- concentration decreased from 87 to 53 mEq/liter while the Cl^- concentration increased from 48 to 93 mEq/liter. In all segments of the intestine K^+ moved into the intestinal lumen against a concentration gradient. Potassium "secretion" was most pronounced in the most distal segments. These results indicate that guinea pig small intestine is a suitable organ for studying active transport of HCO_3^-.

56 A STUDY OF INTESTINAL FAT ABSORPTION IN INFANTS BY THE END-TO-END INTUBATION TECHNIQUE. (Fr.) Giunta, A. (U. Milan Pediat. Clin., Italy), L. Porta and E. Fedeli. *Helv. Paediatr. Acta* 25(3):305-311, 1970.

Mono-, di-, and triglycerides and fatty acid fractions were separated and identified by thin-layer chromatography, and fatty acids were separated and determined quantitatively by gas-liquid chromatography in the intestinal contents of 5 normal infants, aged 9-12 months, after a test meal consisting of casein (6 g), lactose (14 g), olive oil (6 g), 1 egg, and propylene glycol (1.5 g/100 ml of water). Samples of the intestinal contents were taken from the proximal ileum and jejunum 0-180 min after administration of the test meal. After 30 min no triglycerides and only traces of fatty acids were found in the jejunum, and in the ileum no lipids were present at all. All samples from the jejunum contained relatively large quantities of palmitic, palmitoleic, heptadecanoic, heptadecenoic, stearic, oleic, and linoleic acids. The percentages of these fatty acids remained constant independent of the time which had elapsed from administration of the test meal. These findings suggest that fatty acids which are liberated from triglyceride hydrolysis are absorbed rapidly in the small intestine no matter what their chain length or degree of saturation.

57 FRUCTOSE INFLUX ACROSS THE BRUSH BORDER OF RABBIT ILEUM. (E.) Schultz, S. G. (U. Pittsburgh Sch. Med., Pa.) and C. K. Strecker. *Biochim. Biophys. Acta* 211(3):586-588, 1970.

The mechanism involved in unidirectional influx of D-fructose across the brush border of rabbit ileum was compared with the influx mechanism for D-glucose, D-galactose, and 3-O-methyl-D-glucose. Fructose uptake is a linear function of time for at least 1.5 min. The unidirectional influx of D-fructose was a saturable function of concentration which conformed to Michaelis-Menten kinetics. The maximal influx was 6.3 μM/hr cm^2, and the fructose concentration required to elicit a half-maximal influx was 18mM. No significant competitive interaction was observed between fructose and mannitol, D-glucose, D-mannoheptulose, or L-sorbose. The movement of fructose from the lumen of the rabbit ileum into the absorptive cells appears to depend on the presence of a specific carrier mechanism.

58 EFFECT OF BILE SALTS ON TRANSPORT ACROSS BRUSH BORDER OF RABBIT ILEUM. (E.) Frizzell, R. A. (U. Pittsburgh Sch. Med., Pa.) and S. G. Schultz. *Biochim. Biophys. Acta* 211(3):589-592, 1970.

The effect of bile salts on the mucosal border of rabbit ileum was studied in vitro by exposing the ileum to 10 mM sodium taurodeoxycholate and/or a standard buffer solution. The unidirectional influx of alanine across the brush border into the epithelial cells was inhibited both in the presence and absence of Na^+ after exposure to taurodeoxycholate, while the influx of mannitol was increased almost 3-fold. The inhibition of alanine influx was not reversed by 45 min exposure to a taurodeoxycholate-free medium. In contrast, mannitol influx decreased to control values after 30 min exposure to the standard buffer solution. Exposure of the mucosal surface of rabbit ileum to taurodeoxycholate seemingly increases the permeability of the brush border to passively transported substances but inhibits carrier-mediated processes. Electron microscope studies revealed no alteration in brush border or "fuzzy coat" morphology following exposure to taurodeoxycholate.

59 ELECTRICAL ACTIVITY ACROSS THE DEVELOPING RABBIT ILEUM IN VITRO. (E.)

Pongsakorn, S. (Mahidol U. Fac. Sci., Bangkok, Thailand), G. J. Leitch and W. W. Moore. *Experientia* 26(7):739-740, 1970.

The transmural potential difference (PD) was recorded across everted sacs of rabbit distal ileum to study the effect of development on the transmural PD. Both the endogenous PD and the glucose transfer PD increased between the 2nd and 4th week of life, reached maximum values at the 6th week, and then decreased in young adults. At all ages studied the transmural PD was significantly enhanced by addition of glucose to the mucosal bathing medium. When N_2 was substituted for O_2 and the preparation was made hypoxic there was a reduction in the transmural PD measured in the presence of glucose in the adult and 6-week-old ileum. Although sucrose activity did not reach a maximum at 6 weeks, the brush border glucose digestion and transportation systems probably develop simultaneously, perhaps as parts of a single complex.

60 STIMULATION OF INTESTINAL ADENYL CYCLASE BY CHOLERA TOXIN. (E.)

Sharp, G. W. G. (Harvard Med. Sch., Boston, Mass.) and S. Hynie. *Nature (Lond.)* 229(5282):266-269, 1971.

In experiments performed on rabbits adenyl cyclase activity increased in epithelial cells of the rabbit ileum when the lumen of an adjacent ileal loop was treated with cholera toxin (1 mg for 4 hr); no change occurred in phosphodiesterase activity. Qualitatively similar results were obtained by treating jejunal loops with large doses (100 mg) of toxin, but the increase in adenyl cyclase activity was much greater. The greatest activation of adenyl cyclase occurred when 10 µg of choleragen was introduced into ileal loops. Increased adenyl cyclase activity was accompanied by a steady increase in fluid production, probably due to stimulation of active anion transport processes. Thus, the effects of cholera toxin may be due to stimulation of adenyl cyclase.

61 ION TRANSPORT DURING CHOLERA-INDUCED ILEAL SECRETION IN THE DOG. (E.)

Moore, W. L., Jr. (U. Texas(Southwestern) Med. Sch., Dallas), F. A. Bieberdorf, S. G. Morawski, R. A. Finkelstein and J. S. Fordtran. *J. Clin. Invest.* 50(2):312-318, 1971.

Simultaneous measurements of ion transport rates and electrical potential differences were made in the ileum of anesthetized dogs during perfusion of balanced electrolyte solutions containing 100 µg of choleragen. Choleragen caused active secretion of both HCO_3^- and Cl^-, but HCO_3^- seems to be of greater importance in generating fluid production since it was secreted at faster rates and against greater electrochemical gradients than Cl^-. For the first 2 hr after onset of fluid secretion, Cl^- was absorbed rather than secreted and the rate of decrease in Cl^- absorption paralleled the rate of increase in HCO_3^- secretion, suggesting that normal nonelectrogenic Cl^- absorption may have continued and partially obscured cholera-induced Cl^- secretion. Na^+ secretion can be explained by passive ion movement, and K^+ secretion can be partially explained by passive diffusion secondary to the negative intraluminal potential difference. However, the K^+ concentration in secreted fluid is 2-3 times higher than that which would be expected on the basis of passive diffusion alone, suggesting that some K^+ is actively secreted. The potential difference of the cholera-treated ileum responded normally when glucose was added to the perfusing fluid but failed to respond to saline-free mannitol perfusion. This finding suggests that choleragen may alter the differential permeability of the ileum to anions and cations or that the ileal permeability barrier is exposed only to secreted fluid and does not detect the low Na^+ and Cl^- concentrations in the luminal contents during mannitol perfusion.

62 AMINO ACID ABSORPTION IN THE MAMMALIAN COLON. (E.)

Binder, H. J. (Yale U. Dept. Intern. Med., New Haven, Conn.). *Biochim. Biophys. Acta* 219(2):503-506, 1970.

In vitro and in vivo measurements were made of L-alanine absorption in the colon of adult male Sprague-Dawley rats. After correction for fluid movement, 9.12 ± 1.48 µM of L-alanine/g of wet tissue weight disappeared from the colon in in vivo experiments in which 10 mM of L-alanine had been placed in the colon for 30 min. However, evidence of active transport or facilitated diffusion could not be demonstrated in vitro, either by the everted gut sac method or by the ring method. Results from in vitro studies of glycine influx in the large intestines of adult male New Zealand rabbits were similar to the results of L-alanine absorption measurements. Everted gut sac experiments demonstrated that L-alanine did cross the colonic mucosa, disappear from the lumen of the large intestine, and enter the colonic mucosa, but not against a concentration gradient. These findings indicate that some transfer of amino acids does occur and its mechanism is a nonsaturable, non-energy-dependent process, most likely diffusion.

63 ON THE PERMEABILITY OF THE PANCREATIC DUCT MEMBRANE. (E.) Case, R. M. (U. Aarhus Inst. Physiol., Denmark) and T. Scratcherd. *Biochim. Biophys. Acta* 219(2):493-495, 1970.

A fluid containing Na^+, K^+, Cl^-, and HCO_3^- in concentrations found in pancreatic juice secreted at a maximal rate was perfused through the pancreatic duct of fasted cats anesthetized with i.v. chloralose (37.5 mg/kg) and urethan (450 mg/kg). In these experiments the pancreatic duct was cannulated at the point where it pierces the duodenal wall and indirectly at the tail of the pancreas by threading polyethylene tubing through the duct. Excessively large decreases in HCO_3^- and increases in Cl^- occurred, particularly at lower perfusion rates. Direct cannulation of the tail of the pancreas resulted in much smaller exchanges of HCO_3^- and Cl^-. It appears that indirect cannulation causes extensive damage to the epithelium of the pancreatic duct. Thus, measurements of diffusion potentials and relative permeability coefficients calculated from them are probably inaccurate if indirect cannulation of the tail of the pancreas was employed.

64 DETERMINATION OF EXTRACELLULAR SPACE AND INTRACELLULAR ELECTROLYTES IN RAT LIVER IN VIVO. (E.) Williams, J. A. (U. Utah Dept. Pharmacol., Salt Lake City) and D. M. Woodbury. *J. Physiol. (Lond.)* 212(1):85-99, 1971.

After i.p. or i.v. injection measurements were made of the uptake of $^{36}Cl^-$, $^{35}SO_4^=$, ^{51}Cr, ^{131}I-albumin, ^{131}I-polyvinylpyrolidone (PVP), ^{14}C-inulin, and ^{14}C-sucrose in vivo by the livers of male and female Sprague-Dawley rats. The 1 hr inulin space in nephrectomized rats is considered to be the best indicator of extracellular space. Nephrectomy is necessary for the plasma level of inulin to remain constant. Both sucrose and inulin distribute in a space of 10-12% followed by a continuous late increase. The initial space is believed to include most of the interstitial space. Spaces varying from 30-80% were found as early as 15 min after injection of $^{35}SO_4^=$. ^{131}I-albumin and PVP initially distributed in a space of 6-7% and later showed an increase which was more pronounced with PVP. The extravascular portion of this space is believed to correspond to the histological Disse's spaces. After exsanguination a residual intravascular space of 3.0-3.5% was measured with ^{51}Cr-labeled RBC. This space was significantly larger than that in skeletal muscle and was larger in nephrectomized than in intact rats. $^{36}Cl^-$ and stable Na^+ and Cl^- spaces were constant at 19-21% and can be used as the upper limit of extracellular space. Normal cell pH values, determined by the distribution of [^{14}C]-5,5-dimethyl-2,4-oxazolidinedione (DMO), varied around 7.25 while intracellular electrolytes, calculated from the difference between total and extracellular electrolytes, were 22 mM/liter for Na^+, 165 mM/liter for K^+, and 22 mM/liter for Cl^-. There was no significant difference between males and females, and the only effect of fasting was to increase K^+ slightly.

65 A STUDY OF THE MECHANISM OF INTESTINAL ABSORPTION OF BENZO(A)PYRENE. (E.) Rees, E. D. (U. Kentucky Med. Ctr., Lexington), P. Mandelstam, J. Q. Lowry and H. Lipscomb. *Biochim. Biophys. Acta* 225(1):96-107, 1971.

Everted sacs of small intestine incubated in a medium containing 3,4-benzpyrene demonstrated an exponential accumulation of 3,4-benzpyrene (for incubation medium concentrations above 200 μM) as the medium concentration increased. The transfer of 3,4-benzpyrene from sac tissue to the inside medium was proportional to the sac tissue concentration. Tissue accumulation was increased with increased temperature and unchanged by anaerobiosis and/or 0.1 M iodoacetate. The 3,4-benzpyrene also accumulated in strips of small and large intestine and in slices of liver, kidney, and epididymal fat. Adsorption isotherms and time curves for surgical suture incubated in the same media had the same forms as those obtained for intestinal sacs. After intragastric administration 3,4-benzpyrene appeared quickly in the thoracic duct lymph, reaching a peak by the 3rd or 4th hr. Only 20% of the dose was recovered in the lymph. The mechanism of intestinal absorption of 3,4-benzpyrene apparently involves a process of physical adsorption to the intestinal mucosal surface and then passive diffusion through the intestinal wall. There may be 2 phases of adsorption: first, unilayer adsorption, and then multilayer adsorption which would account for the exponential nature of the accumulation. The 2nd phase is discussed with respect to carcinogenesis.

66 INTESTINAL HYDROLYSIS AND LYMPHATIC ABSORPTION OF ISOPROPYL ESTERS OF LONG-CHAIN FATTY ACIDS IN THE RAT. (E.) Savary, P. (Inst. Biol. Chem., Marseille, France) and M. J. Constantin. *Biochim. Biophys. Acta* 218(2):195-200, 1970.

The triglyceride composition of thoracic duct lymph was determined in rats after p.o. administration of dietary triglyceride or acyl-labeled ethyl or isopropyl esters of stearic or myristic acid combined with oleic acid. Lipid was administered either in 9 parts of boiled rice to 1 part lipid or p.o. through a stomach tube. After administration of isopropyl stearate in oleic acid, it was shown that 85-90% of the stearic chains in lymph triglyceride were of dietary origin. Recovery of stearic chains in lymph triglycerides was significantly lower when ethyl stearate was administered with oleic acid or triolein. The same results were obtained when ethyl myristate was used in place of ethyl stearate. Only small quantities of ethyl esters were recovered unhydrolyzed in the lymph in all experiments. When isopropyl stearate and oleic acid were administered, less than 5% of the stearate was found in lymph phospholipids and 95% was present in the triglyceride fraction. Similar results were obtained with isopropyl oleate. Apparently part of the isopropyl ester is hydrolyzed in the intestine and the liberated esters are then reesterified and absorbed into the lymph. Hydrolysis of isopropyl esters in the intestine did not occur to such an extent as hydrolysis of ethyl esters and triglycerides.

67 INTRA-ABDOMINAL ABSORPTION OF SERUM PROTEIN LABELED WITH EVANS BLUE IN EXPERIMENTAL ILEUS. (Ger.) Herczeg, B., P. G. Linke (Martin Luther U. Halle-Wittenberg Physiol. Inst., Halle, Germany) and K. Stekker. *Z. Exp. Chir.* 3(5):315-323, 1970.

Experiments performed on 18 dogs revealed that ileus had no effect on transperitoneal absorption of serum proteins. Dogs were injected intra-abdominally with 2 mg/kg of their own heparinized plasma labeled with 2 ml/kg of Evans blue. Lymph samples were taken at various intervals from the cannulated thoracic duct, right lymphatic trunk, and intestinal trunk. There were no significant differences in the quantity or rate of absorption of the dye-labeled protein in dogs with experimental ileus and in normal controls. In both groups the right lymphatic trunk transported about 4 times more protein than did the thoracic duct. These findings suggest that intra-abdominal absorption is an important compensatory mechanism in ileus by which the lymphatic system maintains homeostasis and normal blood flow by removing and recirculating serum proteins.

68 ABSORPTION OF BILE SALTS FROM HUMAN GASTRIC MUCOSA. (E.) Ivey, K. J. (U. Iowa Hosp., Iowa City) L. Denbesten and S. Bell. *J. Appl. Physiol.* 29(6):806-808, 1970.

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75 INTESTINAL TRANSFER OF L-ARGININE IN RELATION TO AGE. (E.) Penzes, L. (Med. Univ., Budapest, Hungary). *Exp. Gerontol.* 5(3):193-201, 1970.

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(Rus.) Faitelberg, R. O. (State Univ., Odessa, USSR) and G. P. Tkachenko. *Fiziol. Zh. SSSR* 56(10):1478-1482, 1970.

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See also numbers: 231, 232, 276, 433, 766, 830

87 HORMONAL REGULATION OF HUMAN LOWER ESOPHAGEAL SPHINCTER COMPETENCE: INTERACTION OF GASTRIN AND SECRETIN. (E.) Cohen, S. (U. Pennsylvania Hosp., Philadelphia) and W. Lipshutz. *J. Clin. Invest.* 50(2):449-454, 1971.

Manometric measurement of intraluminal pressure in the esophagus, lower esophageal sphincter, and stomach in 54 normal patients showed that rapid i.v. injection of synthetic gastrin I (0.025-1.5 μg/kg) rapidly increased sphincter pressure with a peak response occurring 3 min after injection. A positive dose-response was obtained with a threshold dose of 0.025 μg/kg; peak response occurred with 0.7 μg/kg of gastrin I. The peak response of the lower esophageal sphincter to gastrin I was significantly reduced by secretin, either endogenously released by duodenal acidification or exogenously administered as a rapid i.v. injection (1 U/kg). Continuous i.v. infusion of secretin (0.65 U/kg/hr) shifted the gastrin I dose-response curve to the right, but the curve obtained with gastrin I and secretin paralleled the original curve with gastrin I alone. Maximum sphincter response to gastrin I was still obtained at higher doses. Rapid i.v. injection of secretin produced a dose-related decrease in pressure in a sphincter endogenously stimulated by gastrin. Under basal conditions sphincter response to secretin decreased and larger doses were required for comparable reductions in pressure. These results indicate that: (1) secretin and gastrin interact in the physiological regulation of lower esophageal sphincter competence, (2) secretin markedly inhibits gastrin stimulation of the lower esophageal sphincter, and (3) the inhibitory effect of secretin is competitive in nature.

88 PACEMAKER LOCALIZATION AND ELECTRICAL CONDUCTION PATTERNS IN THE CANINE STOMACH. (E.) Weber, J., Jr. and S. Kohatsu (VA Hosp., Palo Alto, Calif.). *Gastroenterology* 59(5):717-726, 1970.

Electrophysiological experiments in which dogs were subjected to a series of acute gastric transections provide strong evidence that the normal gastric pacemaker is located in the greater curvature of the stomach. The greater curvature is much more important than the lesser curvature in gastric conduction: a greater curvature muscle segment enclosed within only 20% of the gastric circumference is sufficient to maintain normal electrical continuity and entrainment, while a muscle segment along the lesser curvature of 50% of the gastric circumference is not sufficient to maintain normal entrainment. A narrow muscle bridge along the greater curvature, constituting only 20% of the circumference, was an adequate conduction path to provide proximal pacemaker of the entire distal stomach. Anatomical studies provide supporting evidence for the localization of the gastric pacemaker in the greater curvature. Bundles of longitudinal muscle fibers radiate from the pacemaker area on the greater curvature of the proximal body of the stomach along the greater curvature to the antrum and toward the lesser curvature. The absence of slow-wave activity and conduction along the lesser curvature can be explained by the relative paucity of longitudinal muscle fibers in the proximal 3/4 of the lesser curvature.

89 IN VIVO GALLBLADDER CONTRACTILITY BY MALE MOUSE BLOOD SERUM. (E.) Gershbein, L. L. (Northwest Inst. Med. Res., Chicago, Ill.) and J. Feder. *Res. Commun. Chem. Pathol. Pharmacol.* 1(6):757-760, 1970.

Experiments performed on anesthetized dogs showed that i.v. injection of serum from male Swiss, C3H, and BDF_1 mice produced contractions of the gallbladder. This effect was not observed after injections of serum from female mice or serum from male or female dogs, cats, pigs, rabbits, hamsters, sheep, guinea pigs, cows, rats, or humans. Disc electrophoresis showed no differences in the protein patterns of male and female mouse serum so that the contractile agent in male mouse serum must migrate with one or more of the conventional blood proteins. These observations are interesting since the contractile substance in male mouse serum is one of the few cases of a mammalian sex-linked moiety to which a definite physiological or pharmacological activity can be ascribed.

90 NEUROENDOCRINE INFLUENCES ON THE DYNAMICS OF THE CHOLEDOCHAL SPHINCTER. (E.) Dardik, H. (Montefiore Hosp., New York, N. Y.), M. L. Gliedman, R. Christ, A. Koslow and C. J. Schein. *Surg. Gynecol. Obstet.* 131(4): 675-678, 1970.

Passage pressures across the choledochoduodenal junction were measured manometrically in anesthetized adult mongrel dogs whose common bile duct had been intubated toward the duodenum and was then ligated proximally. Bilateral cervical vagotomy reduced passage pressures, but this decrease was prevented by prior bilateral adrenalectomy. No changes in pressure occurred when splanchnic nerves were blocked with lidocaine hydrochloride or after splanchnicectomy or when adrenalectomy preceded vagotomy. Infusion of very small doses of norepinephrine i.v. reduced passage pressures to the same extent as vagotomy, even in adrenalectomized animals. These results indicate that the vagal system of the dog is the dominant extrinsic factor responsible for maintaining normal tone in the choledochal sphincter and for determining the flow resistance across the choledochoduodenal region. Resistance decreases after vagotomy, but this change in dynamics is dependent upon an intact adrenergic system.

91 BASAL ELECTRICAL RHYTHM OF THE INTESTINE AFTER SECTION OR TRANSPOSITION.

(Fr.) Grivel, M.-L. (Natl. Vet. Sch., Toulouse, France), M. Ruckebusch and Y. Ruckebusch. *C. R. Soc. Biol. (Paris)* 164(2):447-454, 1970.

In dogs, transection of the jejunum followed by end-to-end anastomosis, reduced the basal electrical rhythm (BER) of the intestine below the anastomosis by 25-30% while transection of the ileum reduced the BER by only 6%. Because of thickening of the wall and dilatation resulting in partial stasis, antiperstaltic transposition of the jejunum decreased the BER by about 30%. These phenomena were less marked in antiperistaltic transposition of the ileum. Isoperistaltic transplantation of the ileum into the jejunum increased the BER about 20% while isoperistaltic transplantation of the jejunum into the ileum produced no changes in the BER. Y shunts were made in the duodenal and jejunal region by end-to-side anastomosis so that the isolated loop was either permanently filled or permanently empty. Permanently filled jejunal loops were associated with persistent hyperkinesia and often were the point of departure for antiperistaltic waves. Progressive dilatation of the blind loop and thickening of the wall produced intense electrical activity. In permanently empty loops only the effect of transection was evident; no gross or microscopic changes occurred in the wall during a 6 month period.

92 THE EFFECTS OF ISCHEMIA ON INTESTINAL NERVES AND ELECTRICAL SLOW WAVES. (E.)

Khin Kyi Kyi, J. and E. E. Daniel (U. Alberta Dept. Pharmacol., Edmonton, Canada). *Am. J. Dig. Dis.* 15(11):959-981, 1970.

The effects of prolonged ischemia on the electrical and mechanical activity of the jejunum were studied in acute and chronic preparations in dogs. Distorted, irregular slow waves with low frequency and poor coupling compared to those in proximal normal segments were recorded in vivo in postischemic segments of chronic preparations. Typical slow waves were not recorded in acute preparations. Although all postischemic segments were characterized by an absence of reflex responses, contractions were initiated by dimethylphenylpiperazinium methacholine, and nicotine acting on nerves. Rhythmic movements were absent in strips isolated from postischemic segments. Severe smooth muscle damage in acute but not in chronic preparations was demonstrated by analyses of ion contents. Jejunal strips from both control and postischemic segments of chronic preparations responded to transmural electrical stimulation. Contractions were decreased by hexamethonium and prevented by atropine or tetrodotoxin. Apparently, prolonged ischemia produced acute damage to smooth muscle and acute and prolonged damage to intrinsic nervous activity, resulting in abolished reflexes and changes in the electrical and mechanical activity of the intestines.

93 STIMULATION OF α- AND β-RECEPTORS IN THE ISOLATED RAT JEJUNUM. (E.)

Minamidate, A. (Fukushima Med. Coll., Japan). *Experientia* 26(7):755-756, 1970.

A study was made of the effect of α- and β-receptor stimulation on relaxation and contraction of isolated rat jejunal segments. Epinephrine (5×10^{-8} g/ml) caused jejunal relaxation, but when propranolol (2.5×10^{-7} g/ml) was added 5 min before the epinephrine, epinephrine-induced relaxation was inhibited and contraction was increased. Addition of dibenamine (2.5×10^{-7} g/ml) 30 min before epinephrine produced an increase in relaxation. Isoproterenol (5×10^{-9} g/ml) caused relaxation of the jejunum without contraction, this effect being completely blocked by the previous addition of propranolol (2.5×10^{-7} g/ml). Dibenamine (2.5×10^{-7} g/ml) increased the degree of relaxation induced by isoproterenol. Phenylephrine (5×10^{-7} g/ml) caused relaxation followed by contraction in most cases. Stimulation of α-receptors seems to produce an initial relaxation followed by a secondary contraction in the rat jejunum.

94 ADRENERGIC INNERVATION OF THE ILEUM OF THE CAT. (E.)

Silva, D. G. (U. California Ctr. Health Sci., Los Angeles), G. Ross and L. W. Osborne. *Am. J. Physiol.* 220(2): 347-352, 1971.

The adrenergic innervation of the mesentery and ileum of 12 cats was investigated with the use of a histochemical fluorescence method. Numerous adrenergic terminals were present in both the circular muscle layer and the myenteric plexus. The longitudinal muscle layer contained few adrenergic nerves. Ganglion cells of the submucous plexus were surrounded by fluorescent terminals. The arteries and arterioles in the mesentery and all the layers of the gut possessed a dense adrenergic plexus, whereas the veins were only sparsely innervated. As no adrenergic ganglion cells were demonstrated and all specific fluorescence disappeared after section of the mesenteric neurovascular bundles, the adrenergic fibers in the intestinal plexuses and in the muscle layers are probably continuations of extrinsic nerves. These findings demonstrate a sound anatomical basis for the classical view that inhibition of intestinal activity can take place by the direct action of released adrenergic transmitter on muscle cells.

95 EFFECTS OF DRUGS, ILEAL OBSTRUCTION, AND IRRADIATION ON RAT GASTROINTESTINAL

PROPULSION. (E.) Summers, R. W. T. H. Kent (U. Iowa Hosps., Iowa City) and J. W. Osborne. *Gastroenterology* 59(5):731-739, 1970.

A technique was developed for quantitative study of small intestinal propulsive motility by intraduodenal administration of a test solution containing $Na_2{}^{51}CrO_4$ into male Carworth rats. This method is more accurate than one in which the radioactive test solution is administered intragastrically since variations in the rate of gastric emptying are eliminated. Mecamylamine hydrochloride (10 mg/kg s.c.), chlorisondamine chloride (8 mg/kg s.c.), and morphine sulfate (10 mg/kg i.m.) all produced significant retardations in propulsion by both the intragastric and intraduodenal techniques. Tolazoline hydrochloride (15 mg/kg s.c.) and neostigmine methyl sulfate (0.1 mg/kg s.c.) both accelerated propulsion by the intragastric, but not by the intraduodenal, technique. Even though the intestine was dilated after 6 weeks of treatment with chlorpromazine (46 mg/kg i.p. once a week), gastroduodenal propulsion remained unchanged. When duodenal ulcers induced by indomethacin (20 mg/kg through a stomach tube) did not obstruct the intestinal lumen, propulsion was accelerated. Marked gastric retention was observed in rats subjected to whole-body X-irradiation (1400 r) with the intragastric method, but marked acceleration of small intestinal transit occurred with the intraduodenal technique. The intraduodenal technique is recommended because of its technical simplicity and reproducibility.

96 EFFECT OF FATTY ACIDS ON THE CONTRACTION OF GUINEA-PIG ILEUM IN VITRO.

(E.) Jager, F. C. (Unilever Res. Labs., Vlaardingen/Duiven, Netherlands). *Experientia* 26(7):731-732, 1970.

The ability of fatty acids to stimulate contractions of intestinal smooth muscle was studied in vitro in sections of guinea pig ileum. For all active fatty acids (linoleic, linolenic, γ-linolenic, dihomo-γ-linolenic, eicosatrienoic, arachidonic, eicosapentaenoic), steady contraction levels were observed throughout the test (5 min). No correlation could be established between activity and the number of double bonds. Only those fatty acids which can be converted directly or indirectly into prostaglandins appear to possess activity. This conversion which appears to be necessary for activity may be enzymatic and/or be caused by auto-oxidation in vitro.

97 EXPERIMENTS ON THE MECHANISM OF ACTION OF CAERULEIN AT THE LEVEL OF THE GUINEA-PIG ILEUM AND COLON.

(E.) Del Tacca, M. (U. Pisa Dept. Pharmacol., Italy), G. Soldani and A. Crema. *Agents Actions* 1(4):176-182, 1970.

In vivo and in vitro experiments were performed on ileum and colon from adult female guinea pigs to investigate the site and action mechanism of cerulein, a decapeptide with a chemical structure and pharmacological properties resembling those of gastrointestinal hormones. In isolated ileum preparations cerulein significantly increased acetylcholine release when the ileum was stimulated electrically and it produced intense and long-lasting contraction of the longitudinal muscle. The contractile response was reduced by atropine, tetrodotoxin, hemicholinium bromide, and triethylcholine chloride and was potentiated by physostigmine. In isolated guinea pig colon cerulein also produced contractions which were reduced by atropine and tetrodotoxin. At concentrations of 5×10^{-11}-1×10^{-10} g/ml cerulein had no effect on colonic response to bradykinin, exogenous acetylcholine, or sympathetic stimulation but potentiated pelvic nerve stimulation. When injected i.v. into anesthetized guinea pigs, 300 ng-1 μg/kg of cerulein increased the tonus of the colon for 3-4 min and enhanced response to pelvic nerve stimulation. Although the nature and site of the receptor on which cerulein acts to release acetylcholine cannot be deduced from these findings, nicotine receptors do not appear to be involved. The action of cerulein appears to be mediated mainly through nervous pathways and not through histamine or serotonin.

98 EFFECTS OF NICOTINE AND TYRAMINE ON CONTRACTILE ACTIVITY OF THE COLON.

(E.) Weisbrodt, N. W., C. C. Hug, Jr. (U. Michigan Dept. Pharmacol., Ann Arbor), S. K. Schmiege and P. Bass. *Eur. J. Pharmacol.* 12(3):310-319, 1970.

Contractile activity was measured in the descending colon of anesthetized dogs by strain-gauge force transducers before and after i.v. infusion of nicotine (25-250 μg/kg) and tyramine (250 μg/kg). Both of these agents caused primarily a relaxation of the circular and longitudinal muscle which was often followed by secondary stimulation. Bilateral adrenalectomy did not change spontaneous activity in this part of the colon; it reduced both inhibition and stimulation produced by nicotine but not that produced by tyramine. Xylocholine (5 mg/kg i.v.) and reserpine (0.1 mg/kg/day i.m. for 2 consecutive days) pretreatment reduced the early part of the inhibitory response to nicotine. The effects of nicotine were completely eliminated by hexamethonium (5 mg/kg i.v.) or by a combination of bilateral adrenalectomy with either xylocholine or reserpine pretreatment. The effects of tyramine were antagonized by pretreatment with cocaine (5 mg/kg i.v.) or reserpine. The action of both nicotine and tyramine was reduced by a combination of tolazoline (10 mg/kg i.v.) and propranolol (2 mg/kg i.v.). These findings indicate that both nicotine and tyramine relax the colon by releasing catecholamines. Nicotine released catecholamines both from the adrenals and adrenergic nerve endings, while tyramine only released them from the adrenergic nerve endings. The effect of smoking on contractile activity of the colon is considered briefly.

99 ESOPHAGEAL MOTILITY. (Rev.)(E.) Vantrappen, G. (St. Rafael Acad. Hosp., Louvain, Belgium) and J. Hellemans. *R. C. Rom. Gastroenterol.* 2(1):7-19, 1970.

100 ESOPHAGEAL SWALLOWING PATTERN. (Rus.) Freezen, N. A. (North Railway Hosp., Yaroslavl, USSR). *Fiziol. Zh. SSSR* 56(7):1043-1048, 1970.

101 SUPPRESSION OF THE GAG REFLEX BY EXAGGERATED RESPIRATORY MOVEMENTS. (E.) Chaffee, R. B. (Temple U. Sch. Dent., Philadelphia, Pa.), J. Zabara and M. F. Tansy. *J. Dent. Res.* 49(3):572-575, 1970.

102 DEVELOPMENT OF AFFERENT INNERVATION IN ESOPHAGEAL GANGLIA IN SHEEP. (Rus.) Vshivtseva, V. V. (Pavlov Inst. Physiol., Leningrad, USSR). *Arkh. Anat. Gistol. Embriol.* 59(8):89-93, 1970.

103 EFFECT OF GASTRIN PENTAPEPTIDE ON GASTRIC EMPTYING OF LIQUIDS. (E.) Dozois, R. R. (Mayo Clin., Rochester, Minn.) and K. A. Kelly. *Surg. Forum* 21:293-295, 1970.

104 EFFECT OF FAT, GLUCOSE, SALINE, AND PEPTONE SOLUTION ON GASTRIC MOTILITY IN RATS. (Pol.) Radecki, T. (Med. Acad. Physiol. Inst., Cracow, Poland), S. Konturek and J. Kaulbersz. *Acta Physiol. Pol.* 21(4):499-508, 1970.

105 PERIODIC MOTOR ACTIVITY AND CONTRACTION IN FASTING STOMACH IN MYASTHENIA. (Rus.) Kuzin, M. I., K. I. Shirokova, S. V. Chistova and G. M. Smakov. *Klin. Med. (Mosk.)* 48(8):130-138, 1970.

106 THE MYSTIQUE OF THE GASTRODUODENAL JUNCTION. (Rev.) (E.) Code, C. F. (Mayo Clin., Rochester, Minn.). *R. C. Rom. Gastroenterol.* 2(1):20-37, 1970.

107 CINEFLUOROGRAPHIC AND ELECTROPHYSIOLOGIC STUDY OF THE MOTILITY OF THE CHOLEDOCHODUODENAL JUNCTION IN RABBITS. (Jap.) Kakizaki, J. (Hirosaki U. Sch. Med., Japan). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(1):40-49, 1970.

108 NEUROEFFECTOR DRUG INFLUENCES ON PANCREATIC AND BILIARY SPHINCTER RESISTANCES IN THE AWAKE CAT. (E.) Gilsdorf, R. B. (VA Hosp., Minneapolis, Minn.), L. F. Urdaneta and A. S. Leonard. *Curr. Top. Surg. Res.* 2:41-50, 1970.

109 MOTILITY OF THE BILIARY TRACT. (Rev.) (E.) Torsoli, A. (U. Rome 2nd Med. Clin.), M. L. Ramorino and A. Alessandrini. *R. C. Rom. Gastroenterol.* 2(1):67-80, 1970.

110 PROPULSION IN THE SMALL INTESTINE. (Rev.) (E.) Connell, A. M. (Roy. Victoria Hosp., Belfast, Ireland). *R. C. Rom. Gastroenterol.* 2(1):38-46, 1970.

111 EFFECTS OF CENTRAL DENERVATION AND REINNERVATION ON SMALL INTESTINE FUNCTION. (Rus.) Coulik, V. P. and A. N. Makhimenkova. *Fiziol. Zh. SSSR* 56(9):1249-1262, 1970.

112 CONTRACTILE EFFECTS OF SYNTHETIC BRADYKININ ANALOGS ON ISOLATED SMALL INTESTINE. (Jap.) Kameyama, T. (Tohoku Coll. Pharm., Sendai, Japan), K. Sasaki and J. Nabeshima. *(Jap. J. Smooth Muscle Res.)* 6(1):33-39, 1970.

113 TRANSIT TIME IN THE SMALL INTESTINE IN PREGNANCY. (E.) Parry, E. (U. Sheffield Dept. Obstet. Gynecol., England), R. Shields and A. C. Turnbull. *J. Obstet. Gynaecol. Br. Commonw.* 77(10):900-901, 1970.

114 ADRENERGIC RECEPTORS IN THE TERMINAL PART OF THE GUINEA PIG ILEUM. (E.) Dzoljic, M. (Sch. Med., Rijeka, Yugoslavia). *Acta Biol. Iugosl.* 6(3):457-462, 1970.

115 MOTILITY AND PROPULSION IN THE HUMAN COLON. (Rev.) (E.) Texter, E. C., Jr. (Scott White Clin., Temple, Tex.) and N. C. Hightower, Jr. *R. C. Rom. Gastroenterol.* 2(1):47-66, 1970.

116 RELATIONSHIP BETWEEN VENOUS FLOW AND COLONIC PERISTALSIS. (E.) Semba, T. (U. Hiroshima Med. Sch., Japan) and Y. Fujii. *Jap. J. Physiol.* 20(4):408-416, 1970.

117 INTEGRATING MECHANISMS OF ALIMENTARY MOTOR ACTIVITY. (Rev.) (E.) Farrar, J. T. (Med. Coll. Virginia, Richmond). *R. C. Rom. Gastroenterol.* 2(1):1-6, 1970.

118 INDUCTION BY METABOLIC INHIBITORS OF HYPERSENSITIVITY TO THE EFFECTS OF SYMPATHOMIMETIC AGENTS IN ISOLATED RAT INTESTINE.

(Fr.) Valette, G. (Sch. Pharm., Paris) and M. F. Leclair. *J. Pharmacol. (Paris)* 1(4):445-456, 1970.

119 EFFECT OF CERULEIN ON GASTROINTESTINAL MOTILITY IN MAN. (It.) Grossi, F. (U. Rome Med. Therapeut. Inst.), T. Del Duca, S. Spada and M. Grassi. *Clin. Ter.* 54(4):321-327, 1970.

120 INHIBITORY EFFECTS OF ETHANOL ON THE CONTRACTILITY OF GASTROINTESTINAL SMOOTH FIBERS. (Fr.) Lienard, J. (Sch. Med., Amiens, France), M. Freville, J. P. Capron and P. Harichaux. *J. Physiol. (Paris)* 62(Suppl. 2): 294-295, 1970.

121 THE ELECTRICAL ACTIVITY OF THE DIGESTIVE TRACT OF THE SHEEP AS AN INDICATION OF THE MECHANICAL EVENTS IN VARIOUS REGIONS. (E.) Ruckebusch, Y. (Natl. Vet. Sch., Toulouse, France). *J. Physiol. (Lond.)* 210(4): 857-882, 1970.

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See also numbers: 67, 74, 133, 163, 569

123 COLLECTION OF PAROTID SALIVA IN THE UNANESTHETIZED DOG. (E.) Uotinen, K. G. (US Army Inst. Dent. Res., Washington, D. C.) and D. E. Cutright. *J. Dent. Res.* 49(3): 637, 1970.

124 SIMPLIFIED PROCEDURE FOR MEASURING THE EFFECT OF GUSTATORY PERCEPTION ON PAROTID GLAND FLOW RATE. (E.) Shannon, I. L. (VA Outpat. Clin., Boston, Mass.) and R. P. Feller. *J. Dent. Res.* 49(3):532-536, 1970.

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128 CHEWING EFFECTS ON SECRETION RATE OF STIMULATED HUMAN MIXED SALIVA. (E.) Louridis, O. (U. Athens Sch. Med., Greece), N. Demetriou and E. Bazopoulou Kyrkanides. *J. Dent. Res.* 49(5, Pt. 2):1132-1135, 1970.

129 CONDITIONED REFLEX SALIVARY SECRETION IN MAN. (E.) Holland, R. (Univ. Med. Sch., Bristol, England) and B. Matthews. *Arch. Oral. Biol.* 15(8):761-767, 1970.

130 THE PAROTID PUZZLE: A REVIEW OF THE LITERATURE ON HUMAN SALIVATION AND ITS APPLICATIONS TO PSYCHOPHYSIOLOGY. Brown, C. C. (Maryland Psychiat. Res. Ctr., Baltimore). *Psychophysiology* 7(1):66-85, 1970.

See also numbers: 23

STOMACH

131 EFFECT OF PENTAGASTRIN ON GASTRIC HCl SECRETION AND HISTAMINE CONTENT OF THE STOMACH OF RATS. (E.) Lin, T. M. (Lilly Res. Labs., Indianapolis, Ind.) and D. C. Evans. *Arch. Int. Pharmacodyn. Ther.* 188(1):145-155, 1970.

Gastric acid secretion was measured, the total free histamine content of the glandular stomach was determined spectrofluorimetrically, and newly formed histamine was assayed as the insoluble dibenzylsulfonyl-^{14}C-histamine derivative in young female Carworth rats with gastric fistulas after injection of pentagastrin (100 μg/kg s.c.) or saline. Pentagastrin increased gastric acid secretion and total free histamine in the gastric juice and depleted the total free histamine content of the glandular stomach. Peak secretion and maximum depletion of total free histamine occurred about 1 hr after pentagastrin injection. After an initial decrease of about 25%, the total free histamine content in the glandular stomach increased and reached control levels 4 hr after injection when gastric acid secretion was falling to control levels. Preformed ^{14}C-histamine joined total free histamine in the initial mobilization from stores, and parallel enhancement of newly formed histamine and unlabeled total free histamine synthesis occurred later. Full recovery of the isotopic histamine level was reached 4 hr after pentagastrin injection. Total free histamine and ^{14}C-histamine contents in the gastric juice of rats pretreated with ^{14}C-histidine were increased by pentagastrin injection. These increases coincided with changes in the secretory volume and acid secretion, suggesting that the mobilization or depletion of preformed histamine in the glandular stomach may make histamine available to acid-producing cells for acid production. In the glandular stomach histamine content and histamine synthesis are not directly related to acid secretion or the availability of histamine to acid-producing cells.

132 RAT GASTRIC ACID SECRETION STUDIES WITH HISTAMINE AND SYNTHETIC GASTRIN-LIKE PENTAPEPTIDE. (E.) James, R. M. V. (Leicester Polytechnic Sch. Pharm., England). *J. Physiol. (Lond.)* 212(1):181-193, 1971.

Gastric acid secretion was measured after injection of histamine (0.2-10 mg/kg i.v.), pentagastrin (0.2-64 µg/kg i.v.), or a combination of both these agents in urethan-anesthetized male Wistar rats whose stomachs were perfused with a glucose solution at pH 4, a pH at which spontaneous acid secretion is low. The latent period for acid secretion following a single injection of pentagastrin was significantly shorter than that following a single injection of histamine. When a combination of these 2 agents was injected, the latent period was significantly shorter than that for pentagastrin alone. This suggests that one agent sensitizes the acid secretory mechanism to the action of the other. The dose-response curve for pentagastrin was flatter than that for histamine and responses varied greatly. Response to the largest doses of the combined agents was not significantly greater than response to the largest dose of histamine alone, while acid response to low-dose combinations was significantly greater than response to twice the dose of either stimulant alone. The duration of action of both histamine and pentagastrin depended upon dose. The action of histamine at doses above 0.8 mg/kg was of longer duration than that of any of the doses of pentagastrin and this may be an indication of their relative rates of metabolism. Rapid inactivation of pentagastrin could explain why the maximum acid response to a single dose is considerably less than that to histamine. Combination treatment resulted in secretory responses of slightly longer duration than when the agents were administered separately. When infused i.v. over a 2 hr period, the maximum steady rate of secretion in response to pentagastrin was 75% of that to histamine. Acid responses were additive, both when the agents were infused simultaneously over a 2 hr period and when one was administered after a maximum response had been obtained to the other. These findings are indicative of true potentiation.

133 MEASUREMENT OF GASTRIC ACID SECRETION IN THE RAT BY TEST MEAL: EFFECTS OF DISTENSION, PENTAGASTRIN AND PROPANTHELINE. (E.)

Kaye, M. D. (U. Colorado Med. Ctr., Denver). *Am. J. Dig. Dis.* 16(1):9-18, 1971.

Gastric emptying and gastric acid secretion were measured in ether-anesthetized male Wistar rats after they were fed a solution containing sucrose (150 g/liter) and phenol red (100 mg/liter) as a marker at pH 6-6.5. The acid output was greater and gastric emptying more rapid when rats were given a 10% dextrose solution containing 2.5 g/liter of NaCl and 2.5 g/liter of KCl during fasting than when only water was allowed. Optimal conditions were obtained by fasting animals for 48 hr and giving them 10% dextrose ad libitum. Coefficients of variation for acid output and gastric emptying obtained in duplicate tests under resting conditions ranged from 18-30%. Propantheline bromide, administered in drinking water, inhibited acid secretion to the same extent after a test meal and after pyloric ligation. Pentagastrin (2.5-50 µg/kg s.c.) increased the acid output but had no effect on gastric emptying. The dose required to evoke a maximal response is considerably larger in the rat than in man. Serial measurements with test meal volumes of 5, 7.5, and 10 ml and with graded doses of pentagastrin failed to show any relation between gastric acid secretion and the test meal volume. Thus, gastric distension appears to be of little physiological importance for the control of gastric secretion in the rat. Overestimation of gastric emptying and, to a lesser extent, of acid secretion results from incomplete emptying of the stomach and failure to recover all of the phenol red at the end of the test period. These errors can be minimized by using large test meal volumes.

134 INFLUENCE OF HYPERCALCEMIA ON GASTRIC SECRETION AND SERUM GASTRIN CONCENTRATIONS IN MAN. (E.)

Reeder, D. D. (U. Texas Med. Branch, Galveston), B. M. Jackson, J. Ban, B. G. Clendinnen, W. D. Davidson and J. C. Thompson. *Ann. Surg.* 172(4):540-546, 1970.

Gastric acid secretion and serum calcium and gastrin concentrations were measured in 7 patients with duodenal ulcers, aged 32-64 yr; in 7 control patients, aged 27-59 yr; and in 4 healthy mongrel dogs with Heidenhain pouches before, during, and after 2 hr infusion of saline followed by 5 hr infusion of calcium gluconate (4 mg/kg/hr i.v.). An additional loading dose of calcium (4 mg/kg i.v.) was injected slowly over the first 30 min of calcium infusion. In both groups of patients increased serum calcium levels were accompanied by parallel increases in serum gastrin concentrations and by increased acid outputs. Calcium gluconate infusions did not increase either acid outputs or serum gastrin levels in dogs. Basal serum gastrin concentrations were higher in ulcer patients than in controls. Injection of atropine (0.6 mg i.v.) 3-4.5 hr after initiation of calcium infusion consistently reduced calcium-induced increases in gastric acid secretion but did not decrease elevated serum gastrin levels. These findings indicate that increases in gastric acid output induced by calcium are caused by calcium-induced increases in serum gastrin levels. In a supplementary study it was demonstrated that injections of atropine given before calcium infusion do not block calcium-induced increases in serum gastrin concentrations. Atropine may increase serum gastrin by decreasing acid inhibition of the antrum.

135 THE EFFECT OF THEOPHYLLINE ON SUBMAXIMAL GASTRIC ACID SECRETION STIMULATED BY PENTAGASTRIN. (Ger.)

Ottenjann, R. (German Diagn. Clin., Wiesbaden), R. Nitzsche and W. Rösch. *Klin. Wochenschr.* 49(1):56-57, 1971.

In 13 randomly selected patients it was shown that i.v. infusion of theophylline significantly increased H^+, Cl^-, and K^+ secretion stimulated by submaximal doses of pentagastrin i.v. Since no changes occurred in the H^+, Cl^-, or K^+ concentrations, this increase is essentially due to increased gastric secretory volume. These results support the hypothesis that the action of pentagastrin is mediated by cyclic AMP. To confirm this hypothesis, however, it must be shown that pentagastrin increases cyclic AMP formation in the delomorphous cells and that addition of cyclic AMP has qualitatively and quantitatively the same effect as pentagastrin.

136 ANTIGASTRIC ACID SECRETORY ACTIVITIES OF N,N'-BIS(1-NAPHTHYLMETHYL)-1,4-CYCLOHEXANE BIS (METHYLAMINE)DIHYDROCHLORIDE AND STRUCTURALLY-RELATED COMPOUNDS IN THE RAT. (E.)

Lippmann, W. (Ayerst Labs., Montreal, Quebec, Canada). *Arch. Int. Pharmacodyn. Ther.* 188(1): 28-43, 1970.

N,N'-Bis(1-naphthylmethyl)-1,4-cyclohexane bis(methylamine)dihydrochloride, its cis and trans isomers, and a number of structurally-related compounds are potent inhibitors of basal gastric acid secretion in the rat and guinea pig and of histamine-, reserpine-, and pentagastrin-stimulated secretion in the rat. The most active compound was trans-N,N'-bis(5-acenaphthylmethyl)-1,4-cyclohexane bis(methylamine)dilactate; it was 25 times more effective than imipramine in inhibiting basal gastric acid secretion and 8 times more effective in inhibiting pentagastrin-stimulated secretion. In general, substitution of methyl groups for hydrogens on the nitrogen atoms reduced the activity of these compounds although possible differences in the solubility of the salts might also be a factor. Some of these compounds inhibit gastric acid secretion by blocking the uptake of norepinephrine into storage sites and thereby prevent its inactivation. Norepinephrine and other catecholamines have been shown to inhibit gastric acid secretion.

137 CHOLECYSTOKININ-PANCREOZYMIN AS A PHYSIOLOGICAL MEDIATOR OF GASTRIC ACID INHIBITION. (E.)

Odori, Y. (Nagoya U. Sch. Med., Japan) and D. F. Magee. *Pfleugers Arch.* 318(4):287-293, 1970.

The effect of the contents of Thiry-Vella duodenal loops and of Heidenhain pouches on gastric acid secretion was studied in 13 fasting, nonanesthetized dogs in which various compounds were used to stimulate gastric secretion. The presence of fat emulsion or 0.1 N HCl depressed gastric acid secretion stimulated by pentagastrin (2 µg/min i.v.), but when methacholine (2 µg/min i.v.) was the acid stimulus, both acid and fat in the loop increased secretion. Local anesthesia of the loop mucosa with oxethazaine hydrochloride abolished these changes. Cholecystokinin-pancreozymin injections depress pentagastrin-stimulated acid secretion and enhance methacholine-induced secretion, thus the mediator of changes in gastric acid secretion could be cholecystokinin-pancreozymin liberated by the fat emulsion and acid from the loop mucosa.

138 EFFECT OF BILE SALTS ON ANTRAL GASTRIN RELEASE. (E.)

Bedi, B. S., H. T. Debas, G. Gillespie and I. E. Gillespie (Western Infirm., Glasgow, Scotland). *Gastroenterology* 60(2):256-262, 1971.

Experiments performed on 3 mongrel dogs suggest that gastrin release produced by irrigation of the pyloric gland area with bile salt solutions is not a result of nonspecific damage to the pyloric mucosa but may be caused by potentiation of gastrin release by bile salts and endogenous acetylcholine. Vagally innervated antral pouches, were separated from the rest of the stomach by a double mucosal septum, and denervated Heidenhain pouches were formed in the fundus from the greater curvature of the stomach. Irrigation of the innervated antral pouch with a bile salt solution (3.4 parts of sodium glycocholate to 1 part of sodium taurocholate) increased acid outputs in the Heidenhain pouch at total bile salt concentrations of 0.52-2.2% in 2 dogs and at concentrations of 0.52-4.4% in 1 dog. Acid outputs in the Heidenhain pouch were progressively increased by irrigating the antral pouch with 0.05-1.6% acetylcholine solutions, with peak output occurring at a concentration of 1.4% in all 3 animals. When the antral pouch was irrigated with a solution containing both acetylcholine and bile salts, gastrin release was potentiated. No effect on gastrin release was observed when the antral pouch was irrigated with 0.01-1.6% solutions of sodium lauryl sulfate, which has a detergent action comparable to that of the bile salt solution. Thus, the gastrin release induced by bile salts does not appear to be a result of their detergent action, but it is possible that the capacity of bile salts to reduce surface tension may increase the accessibility or efficiency of other locally acting stimulants of gastrin release, such as endogenous acetylcholine.

139 THE RELATION BETWEEN THE RATE OF PRODUCTION OF GASTRIC JUICE AND ITS ELECTROLYTE CONCENTRATIONS. (E.)

Hobsley, M. (Middlesex Hosp., London) and W. Silen. *Clin. Sci.* 39(1):61-75, 1970.

Electrolyte concentrations were determined in gastric secretion from 23 fasting subjects (22 men and 1 woman, aged 23-57 yr) consisting of 4 patients with peptic ulcers, 4 patients with gastrointestinal symptoms but no evidence of peptic ulcers, and 15 subjects with no gastrointestinal symptoms. Samples of gastric juice were collected every 15 min during the plateau of response to an infusion of histamine diphosphate (0.01 mg/kg/hr i.v.). While the K^+ concentration did not change with the rate of secretion, multivariate regression analysis revealed a negative linear correlation between Na^+ concentrations and the H^+ concentration and a positive linear correlation between Na^+ concentration and the rate of secretion. A mathematical analysis of the results suggests that if gastric secretion consists of an acid and a nonacid component, each with a fixed composition, the acid components consists of 143 mEq/liter of H^+, 16 mEq/liter of K^+, and 169 mEq/liter of Cl^-. Under these conditions the nonacid component is apparently secreted at a rate of about 10 ml/15 min in all of the subjects studied and is independent of the average rate of gastric secretion. The data obtained make it possible to detect gross sampling and analytical errors and to predict the rate of secretion from H^+ or Cl^- ions or, more accurately, from the concentrations of both ions. Estimations of the rate of secretion made by this method appear to be more accurate than determining the rate of secretion by direct measurement of volume.

140 EFFECTS OF SOME PHARMACOLOGIC AGENTS ON GASTRIC CATION SECRETION: RATIO OF HYDROGEN TO POTASSIUM IONS. (E.) Berkowitz, J. M. (Mt. Sinai Sch. Med., New York, N. Y.), R. P. Warner, H. D. Janowitz and I. F. Miller. *Proc. Soc. Exp. Biol. Med.* 135(3):804-808, 1970.

Measurements were made of reductions in the outputs of gastric fluid, H^+, K^+, and Na^+ in fasting antrectomized dogs with vagally-denervated fundic pouches under half-maximal steady-state histamine stimulation when secretion was inhibited with atropine sulfate (0.3 mg/kg s.c.) or cyproheptadine (3.0 mg/kg i.v.) or when the histamine dose was reduced. Close correlations between H^+ and K^+ decreases were observed with all 3 techniques, but there was poor correlation between H^+ outputs and Na^+ outputs. These results suggest that gastric secretion of H^+ and K^+ are coupled. Inhibition of histamine-stimulated gastric secretion with atropine and cyproheptadine changed the pattern of gastric electrolyte secretion in a manner different from that of acetazolamide inhibition.

141 EFFECT OF AMBIENT TEMPERATURE ON GASTRIC SECRETION AND FOOD INTAKE IN THE RAT. (E.) Witty, R. T. (Albany Med. Coll., N. Y.) and J. F. Long. *Am. J. Physiol.* 219(5):1359-1362, 1970.

Various dosage schedules and exposure periods were established for groups of adult male Sprague-Dawley rats in a study of the effects of different temperatures (5, 15, 25, and 35C) on gastric secretion and food intake. An inverse relation between both gastric secretion and food intake and temperature was observed. Hypersecretion at 5C was then examined for exposure periods ranging from 3-120 hr either prior to, or immediately after, pyloric ligation. Extended exposure to 5C steadily increased gastric acid secretion with similar increases in pepsin output. Both vagotomy and administration of atropine (1 mg/kg s.c.) to rats exposed to 5C inhibited acid concentration and hypersecretion. It is suggested that feeding behavior and gastric secretion are immediately related to environmental temperatures. Cold temperatures of 5C increased food intake which, in turn, increased gastric secretion. Hypersecretion was not immediate, but developed progressively. These responses are considered to be neurogenic; the hypothalamus is cited as principal controller in the hypersecretion mechanism.

142 RAT GASTRIC SECRETION AND MUCOSAL SEROTONIN FOLLOWING CHRONIC ORAL NICOTINE INGESTION. (E.) Thompson, J. H. (U. California Sch. Med., Los Angeles), M. Angulo and C. A. Spezia. *Res. Commun. Chem. Pathol. Pharmacol.* 1(6):721-732, 1970.

Gastric secretion and gastric mucosal serotonin were measured under basal conditions and after atropine injection (100 µg/ml/kg s.c.) in fasting male Sprague-Dawley rats 2 hr after pyloric ligation. Experimental animals were given average doses of 100 or 1000 µg/kg/day of nicotine for 2 weeks in their drinking water. Nicotine increased the volume of gastric secretion and the gastric acid and pepsin outputs, but only the higher dose of nicotine caused significant increases. This may help to explain the higher incidence of peptic ulcer in smokers than in nonsmokers. Atropine reduced all parameters of gastric secretion equally in control and nicotine-treated animals with the exception that the volume and volume/100 g was less affected in rats given the largest dose of nicotine. Nicotine administration significantly reduced gastric mucosal serotonin. These findings suggest that increased gastric acid outputs observed in nicotine-treated animals may be due to reductions in mucosal serotonin, a potent inhibitor of gastric secretion in the rat.

143 OESTRUS AND GASTRIC SECRETION IN THE DOG. (E.) Landor, J. H. (U. Florida Coll. Med., Gainesville) and R. A. Wild. *Gut* 11(10):855-858, 1970.

Heidenhain pouch secretion decreased suddenly for a 9-18 day period in 5 of 6 mongrel bitches who had symptoms of estrus. Since there were no apparent changes in environment or food which could account for this phenomenon, it is considered likely that secretory inhibition results from hormone changes occurring during estrus. The single exception was a dog with symptoms of estrus that persisted for 1.5 months and were associated with only a slight decrease in secretion; a more pronounced decrease in secretion occurred when estrus appeared again 25 days later. Oophorectomy, performed 10 days later, was followed by an immediate, sustained, rather marked increase in acid output. Neither oophorectomy or sham oophorectomy affected acid secretion appreciably in 10 other bitches. Administration of diethylstilbestrol (5-70 mg/day p.o.) to 1 male and 5 oophorectomized females reduced acid secretion in 3 cases, but these dogs developed such severe anorexia that the drug had to be discontinued. The other 3 dogs exhibited random changes in secretion.

144 SENSORY DEPRIVATION ON VISCERAL ACTIVITY. II. THE EFFECT OF AUDITORY AND VESTIBULAR DEPRIVATION ON CANINE GASTRIC SECRETION. (E.) Schapiro, H. (U. Tennessee Med. Units, Memphis), C. W. Gross, T. Nakamura, L. D. Wruble and L. G. Britt. *Psychosom. Med.* 32(5): 515-521, 1970.

The effect of auditory and vestibular deprivation caused by bilateral labyrinthectomy on gastric secretion was investigated in 4 dogs. The acid output was reduced over a 4 month period, being reduced by 44-97% and 23-40% during the first 30 day interval following histamine injection (0.1 mg and 1.0 s.c., resp.). Insulin (1.0 U/kg i.v.)-stimulated acid output and pepsin secretion were both decreased over a 4 month period, decreasing by 30-47% and 31-65%, resp., during the first 30 day interval. Apparently auditory and vestibular deprivation acts by reducing gastric vagal activity and therefore the sensitivity of the parietal cells, chief cells, and gastrin-producing cells. Reduced gastric acid outputs and pepsin secretion in sensory deprivation may explain why peptic ulcers are rarely or never observed in deaf patients.

145 DOSE RESPONSE RELATIONSHIPS OF INSULIN HYPOGLYCAEMIA AND GASTRIC ACID IN MAN. (E.) Baron, J. H. (Roy. Postgrad. Med. Sch., London). *Gut* 11(10):826-836, 1970.

Gastric acid secretion was measured under basal conditions and after a single injection of soluble insulin (0.01-0.40 U/kg i.v.) in a healthy, 37-yr-old man. A total of 14 insulin tests were run. The peak acid output after insulin injection (measured as the 2 consecutive 15 min samples giving the highest acid output) was significantly correlated with the lowest blood glucose level, the fall in blood glucose, the rate of blood glucose fall, and the maximum fall of blood glucose in any 15 min period. The highest peak acid output values were obtained when 0.1-0.2 U/kg of insulin were used. The smallest dose of insulin which produced an acid response was 0.03 U/kg (blood glucose 26 mg/100 ml). No acid response occurred with 0.01 U/kg of insulin (blood glucose 58 mg/100 ml). In contrast to other reports in the literature, no significant inhibition of acid output was noted in the first 30 min after insulin injection, probably because the insulin preparation used in these studies contains negligible quantities of glucagon (hyperglycemic factor). However, acid output was increasingly inhibited when doses of insulin were large enough to produce blood glucose levels below 15 mg/100 ml. These findings do not support the hypothesis that insulin-stimulated gastric acid secretion is an "all-or-nothing" phenomenon. They suggest that insulin hypoglycemia provides a quantitative glycopenic stimulus which produces a quantitative vagal acid response.

146 THE EFFECT OF INSULIN UPON THE SECRETORY RESPONSE TO FEEDING IN DOGS WITH SELECTIVE VAGOTOMY OF THE PARIETAL CELL MASS. (E.) Amdrup, B. M. (U. Washington Sch. Med., Seattle) and C. A. Griffith. *Scand. J. Gastroenterol.* 5(8):655-665, 1970.

A study was made of the effect of feeding and insulin-induced hypoglycemia on Heidenhain pouch secretion in dogs which had undergone selective gastric vagotomy or selective gastric vagotomy plus suprapyloric antrectomy. Controls were nonvagotomized dogs subjected to suprapyloric antrectomy, suprapyloric transection, or pyloroplasty. Insulin (0.5 U/kg) was injected i.v. 30 min before feeding. In some cases an additional 0.4 U/kg of insulin was injected 30-60 min after feeding. Heidenhain pouch secretion reached a maximum 3 hr after feeding in dogs which had undergone selective vagotomy and selective vagotomy plus suprapyloric antrectomy. In these dogs insulin significantly inhibited secretion for the first 2 hr after feeding and significantly stimulated it in the 4th hr. This effect was more pronounced with double doses of insulin. No inhibition was observed in dogs subjected to pyloroplasty. Insulin consistently stimulated secretion in nonvagotomized dogs subjected to suprapyloric antrectomy. Stimulation of Heidenhain pouch secretion probably results from vagal action on the antrum while inhibition might be produced by vagal action on the duodenum.

147 THE EFFECT OF A GANGLION-BLOCKING AGENT (HEXAMETHONIUM BROMIDE) UPON THE SECRETORY RESPONSE TO FEEDING IN DOGS WITH SELECTIVE VAGOTOMY OF THE PARIETAL CELL MASS. (E.) Amdrup, B. M. (U. Washington Sch. Med., Seattle) and C. A. Griffith. *Scand. J. Gastroenterol.* 5(8):667-674, 1970.

A study was made of the effect of feeding and ganglionic blocking on Heidenhain pouch secretion in dogs with selective gastric vagotomy with and without suprapyloric antrectomy. Controls were nonvagotomized dogs subjected to suprapyloric antrectomy, suprapyloric transection, or pyloroplasty. Hexamethonium bromide (5 mg/kg) was injected i.v. 15 min before feeding. In some experiments an additional 2.5 mg/kg was injected 30-60 min after feeding. In vagotomized dogs hexamethonium bromide significantly inhibited Heidenhain pouch secretion during the first 3 hr after feeding and significantly stimulated secretion in the 4th and 5th hr. Total secretion was significantly lower with the higher dose of hexamethonium. Hexamethonium had the same effect on Heidenhain pouch secretion in nonvagotomized dogs with suprapyloric antrectomy as in vagotomized dogs. The amount of secretion was too low to be evaluated in nonvagotomized dogs with suprapyloric transection. Hexamethonium did not have a significant effect on secretion in dogs with pyloroplasty. Although both insulin and hexamethonium first inhibit and then stimulate Heidenhain pouch secretion, their mode of action must be different because double doses of insulin had a more pronounced effect on secretion than single doses while double doses of hexamethonium had a less pronounced effect. Inhibition of secretion by hexamethonium may result from blockage of vagal stimulation of the antrum, while delayed hypersecretion may be due to blockage of vagal-mediated intestinal inhibition.

148 DOSE-RESPONSE RELATIONSHIP OF THE EFFECT OF SECRETIN ON ACID AND PEPSIN SECRETION IN MAN. (E.) Berstad, A. (Ulleval Hosp., Oslo, Norway) and H. Petersen. *Scand. J. Gastroenterol.* 5(8):647-654, 1970.

A study of the kinetics of pentagastrin-stimulated gastric acid secretion, made on 3 healthy 21-yr-old men, revealed that secretin competitively inhibited acid secretion. Secretin (0.15-5.4 μg/kg/hr) and pentagastrin (0.1-2.5 clinical U/kg/hr) were dissolved in 0.15 M sodium chloride and infused, either alone or in combination, i.v. at a rate of 30 ml/hr. The percentage of inhibition of acid secretion increased with increasing doses of secretin and was due primarily to a decrease in the volume of gastric secretion. Only slight changes occurred in the acid concentration. The pepsin concentration and the ratio of pepsin to acid in gastric juice increased significantly with increasing doses of secretin. Combinations of secretin and pentagastrin produced more pepsin secretion than either agent alone, suggesting that these hormones potentiate pepsin secretion in humans.

149 PEPSIN SECRETION IN MAN AFTER HISTALOG STIMULATION. (E.) Turner, M. D. (U. Rochester Sch. Med. Dent., N. Y.), P. J. Mayer, L. L. Miller and H. L. Segal. *Gut* 11(10): 843-846, 1970.

Samples of gastric juice were collected from 3 normal subjects (2 men and 1 woman in the 3rd decade) under basal conditions and after a single injection of β-aminoethylpyrazole hydrochloride (Histalog; 1.7 mg/kg i.m.). Chromatography on columns of diethylaminoethyl (DEAE)-cellulose gave 3 pepsin fractions. Histalog increased the output of all 3 pepsin fractions. Variations in the relative proportions of these fractions were small and there was no evidence for selective stimulation of any of them.

150 THE EFFECT OF ACUTE HYPERMAGNESEMIA ON THEOPHYLLINE-STIMULATED ACID, ELECTROLYTE, AND PEPSINOGEN SECRETION IN THE HUMAN STOMACH. (Ger.) Miederer, S. E. (U. Bonn Med. Polyclin., Germany), H. Stadie and O. Stadelmann. *Klin. Wochenschr.* 49(1):24-27, 1971.

During the first 60 min, theophylline infusions (3.75 mg/min i.v. given as theophylline ethylenediamine) increased gastric secretory volume and 15-min outputs of H^+, Cl^-, K^+, Na^+, and pepsin in 12 subjects (9 men and 3 women with a mean age of 27 yr). The Na^+ concentration decreased, but the K^+ concentration remained unchanged. Theophylline-induced increases in gastric acid secretion can be explained as the result of inhibition of 3',5'-AMP phosphodiesterase followed by an increase in the intracellular concentration of cyclic AMP; it is not known whether this mechanism has any effect on pepsinogen secretion. Infusion of Mg^{++} (7.58 mg/min i.v. as the ascorbinate) inhibited theophylline-induced increases in gastric secretory volume and 15-min outputs of H^+, Cl^-, K^+, Na^+, and pepsin. Concentrations of H^+ increased significantly in the 5th 15-min sample, and concentrations of K^+ decreased significantly in the 8th 15-min sample. Concentrations of Na^+, Cl^-, and pepsin remained unchanged. Mg^{++}-induced inhibition of theophylline-induced increases in gastric acid secretion may be due to a reduction in adenyl cyclase activity, but it is also possible that Mg^{++} partially abolishes theophylline-induced blockage of 3'5'-AMP phosphodiesterase by activating this enzyme.

151 ^{14}C-GLUCOSAMINE INCORPORATION IN THE MUCOSAL CELLS OF THE GASTRIC ANTRUM AND FUNDUS IN MINIPIGS. (Fr.) Léonard, J. P. (Edouard Herriot Hosp., Lyon, France) and R. Lambert. *C. R. Soc. Biol. (Paris)* 164(1):166-168, 1970.

The incorporation of ^{14}C-glucosamine and of ^{3}H-leucine was determined in the postmitochondrial supernatant, nonparticulate cytoplasm, and endoplasmic membranes of mucosal cells in the gastric fundus and antrum of a minipig. All cell fractions from the fundal mucosa incorporated 1.5-2 times as much ^{3}H-leucine as those from the antral mucosa while all cell fractions from the antral mucosa incorporated 2 times as much ^{14}C-glucosamine as those from the fundal mucosa. Increased protein metabolism in the fundus is largely due to the synthesis of pepsin by the adelomorphous cells. The more rapid incorporation of glucosamine in the antrum is more likely a reflection of the quantitative difference in glycoproteins rather that of a high glucosamine content in antral carbohydrate chains. However, it is also possible that the metabolic rate is faster in the mucosal cells of the gastric antrum.

152 THE ROLE OF ENDOGENOUS GASTRIN IN THE ACTIVATION OF GASTRIC HISTIDINE DECARBOXYLASE IN THE RAT, EFFECT OF ANTRECTOMY AND VAGAL DENERVATION. (E.) Håkanson, R. (U. Lund Dept. Pharmacol., Sweden) and G. Liedberg. *Eur. J. Pharmacol.* 12(1):94-103, 1970.

Studies performed on adult male Wistar rats suggest that gastric histidine decarboxylase is activated as a result of gastrin-induced stimulation of the enzyme-containing cell. Both vagal activity and the antral pH are involved in regulating gastrin release. In antrectomized rats the increase in histidine decarboxylase activity which followed feeding was reduced and that produced by injection of carbachol (0.5 mg/kg s.c.) or hog insulin (10 IU/kg i.m.) was eliminated, but the increase produced by pentagastrin (250 μg/kg i.p.) remained unchanged. Antrectomy reduced basal acid secretion in rats with chronic gastric fistulas, but acid putput still increased after insulin stimulation. This indicates that vagal stimulation of gastric acid secretion can occur in the absence of gastrin and without activation of histidine decarboxylase. Thus, vagal stimulation apparently acts directly on delomorphous cells without histamine as a mediator. Antral exclusion markedly activated histidine decarboxylase, providing evidence that antral gastrin is the mediator of enzyme activation. The activity of histidine decarboxylase increased after truncal vagotomy, but feeding or pentagastrin did not produce a further increase. Selective gastric vagotomy, but not selective extragastric vagotomy, activated histidine decarboxylase. Enzyme activity was not affected by pyloroplasty or by selective denervation of the pancreas, small intestine, and right colon resulting from transection of only the celiac branch of the posterior vagus nerve. Sympathectomy alone had no effect on enzyme activity or the marked activation produced by truncal vagotomy. However, when truncal vagotomy and sympathectomy were combined, enzyme activity was higher than with truncal vagotomy alone. Antrectomy completely eliminated the enzyme-activating effect of truncal vagotomy. The high enzyme activity produced by vagotomy was abolished by perfusion of the stomach with 0.2N HCl, suggesting that gastrin release is inhibited by low antral pH values and is stimulated by high antral pH values present after vagotomy. In rats with chronic gastric fistulas vagotomy significantly reduced gastric acid secretion and inhibited the secretory response to insulin and pentagastrin.

153 THE ROLE OF THE VAGUS NERVES IN THE GASTRIC SECRETION OF PUPPIES. (E.) Gzgzian, D. M. (I. M. Sechenov Inst. Evol. Physiol., Leningrad, USSR). *J. Evol. Biochem. Physiol.* 6(1):39-42, 1970.

154 STOMACH SECRETION AFTER CEREBELLECTOMY IN DOGS. (Rus.) Gzgzian, D. M. (Inst. Evol. Physiol., Leningrad, USSR). *Fiziol. Zh.* 56(7):1049-1054, 1970.

155 EFFECTS OF THE ANTICHOLINERGIC AGENT SULTROPONIUM BY MEASURING VARIATIONS IN GASTRIC ACID SECRETION. (Fr.) Ribet, A. (Purpan Hosp., Toulouse, France), A. Louis and J. Frexinos. *Therapeutique* 46(9):917-920, 1970.

156 NEUROHORMONAL REGULATION OF THE DIGESTIVE GLANDS. (Rev.) (Pol.) Konturek, S. (Med. Acad. Inst. Physiol., Cracow, Poland). *Acta Physiol. Pol.* 21(5, Suppl. 1): 113-130, 1970.

157 INTESTINAL HORMONES AS INHIBITORS OF GASTRIC SECRETION. (Rev.) (E.) Johnson, L. R. (U. Oklahoma Sch. Med., Oklahoma City) and M. I. Grossman. *Gastroenterology* 60(1):120-144, 1971.

158 RECIPROCAL EFFECTS OF INTESTINAL HORMONES ON GASTRIC SECRETION. (Ger.) Miederer, S. E. (U. Bonn Med. Polyclin., Germany), P. Deyhle and R. Ottenjann. *Med. Welt* 21(43):1865-1869, 1970.

159 COMPARATIVE STUDY OF THE EFFECTS OF PREDNISOLONE AND FLUOCORTOLONE ON GASTRIC ACID SECRETION. (Ger.) Seifert, E. (Med. Tech. Inst., Hannover, Germany). *Med. Welt* 21(49):2127-2131, 1970.

160 SALICYLATES AND GASTRIC JUICE. (E.) Clarke, A. E. (U. Melbourne Dept. Med., Australia), J. C. Presser and M. A. Denborough. *J. Pharm. Pharmacol.* 22(11):853-855, 1970.

161 THE EFFECT OF CALCIUM ACETYLSALICYLATE ON THE CONTENT AND DISTRIBUTION OF MUCUS IN THE RAT STOMACH. (E.) Johansson, H. (U. Uppsala Dept. Surg., Sweden) and B. Lindquist. *Acta Soc. Med. Ups.* 75(1-2):85-89, 1970.

162 INCREASED STOMACH SECRETION AFTER I.V. ADMINISTRATION OF AMINO ACIDS. (Ger.) Classen, M. (Univ. Med. Klin., Erlangen/Nurnberg, Germany), H. Koch and T. Takebe. *Med. Ernahrung (Mdzea)* 11/7:153-155, 1970.

163 PHYSIOLOGICAL STUDIES ON SYNTHETIC PEPTIDES. I. EFFECTS OF GASTRIN-LIKE PEPTIDES ON GASTRIC ACID SECRETION AND MOTILITY IN CATS. (Jap.) Higari, K. (Tanabe Seiyaku Co. Clin. Pharmacol. Dept., Osaka, Japan), N. Akaike and T. Danno. *(J. Physiol. Soc. Jap.)* 32(7):439, 1970.

164 DETERMINATION OF ELECTROLYTE CONCENTRATIONS IN GASTRIC SECRETION FOLLOWING HISTAMINE LOADING IN NORMAL SUBJECTS. (Fr.) Ligny, G. (Civil Hosp., Charleroi, Belgium) and J. Manouiloff. *Bull. Soc. Clin. Hop. Charleroi* 21(3):113-125, 1970.

165 PENTAGASTRIN AND HISTAMINE STIMULATION OF HUMAN GASTRIC SECRETION. (Pol.) Konturek, S. (Med. Acad. Inst. Physiol., Cracow, Poland) and J. Oleksy. *Pol. Arch. Med. Wewn.* 44(6):583-588, 1970.

166 EFFECT OF GASTRIN PENTAPEPTIDE ON CANINE GASTRIC MUCUS, PEPSIN, AND ACID SECRETION. (E.) Wise, L. (Washington U. Sch. Med., St. Louis, Mo.) and W. F. Ballinger. *Curr. Top. Surg. Res.* 2:11-24, 1970.

167 INHIBITION OF GASTROINTESTINAL SECRETION. (Rev.) (E.) Wormsley, K. G. (Maryfield Hosp., Dundee, Scotland). *Gut* 11(10):883-887, 1970.

168 EFFECT OF BODY WEIGHT ON GASTRIC ACIDITY. (Ser.) Soljan, N. (Dr. M. Stojanovic Gen. Hosp., Zagreb, Yugoslavia). *An. Bolnice 'Dr. M. Stojanovic'* 9(1-2):83-86, 1970.

169 DECREASED GASTRIC SECRETION DURING MUSCULAR EXERCISE. (Ger.) Frenkl, R. (Med. U. Budapest, Hungary), P. Keszler, L. Csalay and G. Csakvary. *Med. Sport (Berlin)* 10(9):281-282, 1970.

170 DETERMINATION OF TOTAL PROTEINS IN GASTRIC JUICE. Paris, J. (INSERM Res. Unit. Protein Biol., Lille, France), G. Biserte and A. Gerard. *Lille Med.* 15(6):879-886, 1970.

171 THE GASTRIC MUCOSAL BARRIER: PHYSIOLOGICAL AND CLINICAL CONSIDERATIONS. (E.) Werther, J. L. (Mt. Sinai Sch. Med., New York, N. Y.). *Mt. Sinai J. Med. NY* 37(4):482-491, 1970.

172 DEVELOPMENTAL CHANGES IN ATPase AND K^+ STIMULATED PHOSPHATASE OF TADPOLE GASTRIC MICROSOMES. (E.) Limlomwongse, L. (U. California Dept. Physiol. Anat., Berkeley) and J. G. Forte. *Am. J. Physiol.* 219(6):1717-1722, 1970.

173 EXPERIMENTAL STUDIES ON CARBONIC ANHYDRASE ACTIVITY IN THE GASTRIC MUCOSA AND ON THE FINE STRUCTURE OF THE PARIETAL CELL. (E.) Nakamura, I. (Med. Coll., Osaka, Japan), A. Wakabayashi and T. Tsutumi. *Bull. Osaka Med. Sch.* 16(1):50-62, 1970.

See also numbers: 33, 34, 35, 451

PANCREAS

174 RESPONSE OF RABBIT PANCREAS IN VITRO TO ADRENERGIC AGONISTS AND ANTAGONISTS. (E.) Hubel, K. A. (U. Iowa Dept. Med., Iowa City). *Am. J. Physiol.* 219(6):1590-1594, 1970.

An in vitro study of the effects of the α-receptor blocking agent, phenoxybenzamine (2 mg/kg i.p. 16 hr before excision of the pancreas), and the β-receptor blocking agent, propranolol hydrochloride (4.8×10^{-5} M added to the bath), on the action of L-norepinephrine demonstrated that reduction of the pancreatic flow rate produced in rabbits by adrenergic drugs is probably mediated by an α-receptor associated with the secretory cells. L-norepinephrine progressively decreased the rate of pancreatic juice flow as the bath concentration of this adrenergic agent was increased from 2.4×10^{-8} M to 2.4×10^{-5} M. Isoproterenol reduced the pancreatic flow rate only at concentrations of 3.9×10^{-5} M or higher, and 100 times more isoproterenol than norepinephrine were required to reduce the flow rate by a given amount. When phenoxybenzamine was injected i.p. into the rabbit, it prevented the reduction in flow rate caused by the highest concentration of norepinephrine, but propranolol present in the bath did not. When only phenoxybenzamine or propranolol alone were present in the bath, neither drug affected the flow rate significantly. Norepinephrine did not retard the flow rate by dilating the pancreatic duct since the luminal fluid capacity of the ducts did not increase when norepinephrine was added to the bath. The flow rate was reduced 60-90 sec after addition of norepinephrine to the bath, and the maximum response was reached within 4 min. No evidence was obtained on the mechanism by which splanchnic nerve discharge reduces pancreatic juice flow.

175 THE EFFECT OF THEOPHYLLINE ON THE ACTIONS OF PANCREOZYMIN AND SECRETIN. (E.) Pederson, R. A. (U. British Columbia Dept. Physiol., Vancouver, Canada), J. A. Pearson and J. C. Brown. *Experientia* 26(9):961-962, 1970.

Experiments were performed on fasted, chloralose-anesthetized cats, which had undergone splanchnicectomy and cervical vagotomy, to determine the effect of theophylline (6 mg/kg i.v.) on the flow rate and enzyme output of pancreatic juice secreted in response to exogenous secretin (11.6 clinical U/hr i.v.) and pancreozymin (24 Crick Harper Raper U/kg/hr). Theophylline increased pancreatic protein output significantly without affecting the flow rate. By doubling the dose of secretin it was demonstrated that no increase occurred in the flow rate, suggesting that the flow rate had already reached a maximum level. In 5 of 6 experiments theophylline increased the pepsin output, and in all experiments the doubled dose of secretin increased pepsin output. This evidence suggests that cyclic AMP may be involved in mediating the pancreatic action of pancreozymin and the pepsin-stimulating action of secretin.

176 EFFECT OF CAERULEIN ON PROTEIN SYNTHESIS AND SECRETION IN THE GUINEA-PIG PANCREAS. (E.) Meldolesi, J. (U. Milan Inst. Pharmacol., Italy). *Brit. J. Pharmacol.* 40(4): 721-731, 1970.

Cerulein, a polypeptide with a structure similar to that of pancreozymin, greatly increased pancreatic secretion in anesthetized guinea pigs when injected s.c. (4 μg/kg) or i.v. (400 ng/kg). Protein synthesis was stimulated in vitro when pancreas slices were incubated in Krebs-Ringer bicarbonate solution containing 2.5 ng/ml of cerulein. Cerulein had no effect on ^{14}C-L-leucine incorporation in pancreas slices incubated for 10 min with 2.5 ng/ml or in slices from animals injected with 400 ng/kg i.v. 90 or 180 min before sacrifice, but leucine incorporation was doubled in slices from guinea pigs which had been fasted for 4 days and injected with 4 μg/kg s.c. of cerulein twice a day during this period. A single s.c. injection of cerulein given 4 hr before fasted guinea pigs were sacrificed had no effect on in vitro leucine incorporation nor did treatment with bethanechol (600 μg/kg s.c. twice a day for 4 days), a cholinergic secretagogue. These results indicate that in the guinea pig stimulation of pancreatic enzyme secretion does not necessarily increase the rate at which digestive enzymes are synthesized, and that increased protein synthesis depends both on the nature of the secretagogue and on the experimental conditions.

177 ZYMOGEN SECRETION AND PHOSPHOLIPID METABOLISM IN THE PANCREAS. PHOSPHOLIPIDS OF THE ZYMOGEN GRANULE. (E.) White, D. A. (U. Calgary Dept. Chem., Alberta, Canada) and J. N. Hawthorne. *Biochem. J.* 120(3): 533-538, 1970.

When guinea pig pancreas slices were incubated in the presence of ^{32}P-orthophosphate with 0.1 mM of acetylcholine and 0.1 mM physostigmine, secretion occurred and the specific radioactivities of phosphatidylinositol and phosphatidylethanolamine increased significantly. Acetylcholine did not increase the specific radioactivity of the terminal phosphate of ATP, either because of the effect of acetylcholine was masked by other labeled ATP or because the biosynthesis of phosphatidic acid and phosphatidylinositol is affected after ATP has been formed. The specific radioactivity of phosphatidylinositol but not that of other phospholipids was increased in pancreatic homogenates from guinea pigs injected i.p. with ^{32}P-labeled inorganic phosphate and 25 U pancreozymin. Phosphatidic acid was also highly labeled but its specific radioactivity could not be measured accurately since it made up only 2% of the total lipid phosphorus. In vitro studies on bovine pancreas homogenate and subcellular fractions revealed that acetylcholine (10 mM-10 μM) or pancreozymin (1-20 U/ml) did not cause reproducible increases in the activities of diglyceride kinase or phosphatidylinositol inositolphosphohydrolase. Phospholipid analysis of the subcellular fractions showed that zymogen granules had a very high cholesterol:lipid phosphorus ratio resembling that of plasma membrane. Phosphatidylinositol was the phospholipid present in largest quantities in the granule fraction. During fractionation phospholipase A sometimes produced lysophospholipids in the mitochondrial, microsomal, and zymogen granule fractions.

178 PANCREATIC DIGESTIVE ENZYMES: INFLUENCE OF A DIET THAT AUGMENTS PANCREATITIS. (E.) Haig, T. H. B. (U. Saskatchewan Dept. Surg., Saskatoon, Canada). *J. Surg. Res.* 10(12): 601-607, 1970.

In 4 adult mongrel dogs a high-fat diet, which has been shown to increase the susceptibility of dogs to pancreatitis induced by infusion of bile and trypsin into the main pancreatic duct, had no effect on the total amount of enzyme protein or on the proportions of lipase, amylase, trypsinogen, or chymotrypsinogen in pancreatic juice obtained directly from the pancreatic duct after infusion of secretin and pancreozymin (0.1 Crick, Harper, and Raper U/kg/min each). These results do not indicate that pancreatic enzymes play no role in the etiology of pancreatitis, but suggest that these enzymes are not critical in determining the ease with which acinar cells lose their integrity and undergo autodigestion. The high-fat diet may increase susceptibility to pancreatitis by reducing the cell membrane's ability to resist both external injury and autodigestion from within.

179 ISOLATION AND PARTIAL IDENTIFICATION OF PANCREATIC COLIPASE. (E.) Maylié, M. F. (CNRS Biochem. Molec. Biol. Ctr., Marseille, France), M. Charles, C. Gache and P. Desnuelle. *Biochim. Biophys. Acta* 229(1):286-289, 1971.

Purification of porcine pancreatic lipase by sephadex filtration following column chromatography revealed that the concentration of bile salts necessary for full lipase activity was reduced by almost 50%; this suggests the existence of an effector bound to lipase, termed a colipase. The colipase was isolated by precipitation in an 80% saturated ammonium sulfate solution and diethylaminethyl cellulose column chromatography. The Yphantis method gave molecular weights of 9400 and 9900. The purified colipase was termed a protein after its amino acid substructure was determined by hydrolysis. No methionine or tryptophan were found, and thermal stability due to the 5 disulfide bridges was observed. It is concluded that the small colipase is associated with yet another, unidentified protein component.

180 EFFECTS OF ATROPINE ON PIGEON PANCREAS. (E.) Morisset, J. (VA Hosp., Augusta, Ga.) and P. D. Webster. *Am. J. Physiol.* 219(5): 1286-1291, 1970.

181 INHIBITION OF EXOCRINE PANCREATIC SECRETION BY GLUCAGON AND D-GLUCOSE GIVEN INTRAVENOUSLY. (E.) Nakajima, S. (Creighton U. Sch. Med., Ohama, Nebr.) and D. F. Magee. *Canad. J. Physiol. Pharmacol.* 48(5): 299-305, 1970.

182 THE ORIGIN AND SECRETION OF PANCREATIC JUICE BICARBONATE. (E.) Case, R. M. (U. Newcastle upon Tyne Med. Sch., England), T. Scratcherd and R. D. Wynne. *J. Physiol. (Lond.)* 210(1):1-15, 1970.

183 *IN VITRO* AND *IN VIVO* EFFECTS OF PANCREOZYMIN, URECHOLINE, AND CYCLIC AMP ON RAT PANCREAS. (E.) Morisset, J. A. (VA Hosp., Augusta, Ga.) and P. D. Webster. *Am. J. Physiol.* 220(1):202-208, 1971.

184 GASTROINTESTINAL HORMONES. II. CHOLECYSTOKININ-PANCREOZYMIN. INTERACTIONS. (Fr.) Vagne, M. (Edouard Herriot Hosp., Lyon, France). *Pathol. Biol. (Paris)* 18(21-22): 997-1011, 1970.

185 STIMULATION OF HUMAN PANCREATIC ENZYME SECRETION BY PANCREOZYMIN. (Fr.) Vagne, M. (E. Herriot Hosp., Lyon, France) and M. L. Descos. *Arch. Fr. Mal. App. Dig.* 59(9): 618-619, 1970.

186 SOME ASPECTS OF EXOCRINE PANCREAS SECRETION. OBSERVATIONS WITH THE AUGMENTED SECRETIN TEST. (Sp.) Bordalo, O. (Santa Maria Hosp., Lisbon, Portugal). *Rev. Clin. Esp.* 118(6):515-520, 1970.

187 EFFECT OF SECRETIN ON BILE FORMATION IN SHEEP. (E.) Heath, T. (U. New South Wales Sch. Physiol., Kensington, Australia). *Q. J. Exp. Physiol.* 55(4):301-312, 1970.

188 RETARDED HYDROLYSIS BY PANCREATIC LIPASE OF SEED OILS WITH *trans*-3 UNSATURATION. (E.) Kleiman, R. (Northern Reg. Res. Lab., Peoria, Ill.), F. R. Earle, W. H. Tallent and I. A. Wolff. *Lipids* 5(6):513-518, 1970.

189 NEW METHODS FOR STUDYING PANCREATIC SECRETION. (Pol.) Konturek, S. (Med. Acad. Inst. Physiol., Cracow, Poland). *Wiad. Lek.* 23(15):1311-1316, 1970.

190 NEW METHODS FOR MAKING CHRONIC PANCREATIC FISTULAS IN CATS. (Pol.) Konturek, S. J. (Med. Acad. Inst. Physiol., Cracow, Poland), J. Dubiel and B. Gabrys. *Acta Physiol. Pol.* 21(4):589-597, 1970.

See also numbers: 11, 63, 85

191 MULTIPLICATION AND POLYPLOIDY IN RAT LIVER CELLS. A STUDY OF DISORDERS IN PHYSIOLOGICAL REGULATION CAUSED BY INJECTION OF CHEMICAL IRRITANTS. (Fr.) Nadal, C. (INSERM Radium Inst., Orsay, France). *Wilhelm Roux' Arch. Entwickl.-Mech. Org.* 166(2):136-149, 1970.

Histological and autoradiographic studies were made of liver cells in Wistar rats of various ages after injection of a casein solution. An increase in the number of cells entering the S-phase occurred 15-18 hr after s.c. injection of 140 mg of casein into 7-10-day-old rats. Almost all of the cell divisions which would normally occur during the next 30-40 hr were initiated in a 2 hr period. The number of cells entering the S-phase subsequently decreased, probably due to inhibition of liver cell mitosis. In general, a significant decrease occurred in the number of cells entering the S-phase 12 hr after 22-26-day-old rats were given 2 simultaneous s.c. injections of 175 mg casein and when 30-40-day-old rats were given 3 simultaneous s.c. doses of 280 mg casein. In 7-10-day-old rats this decrease was followed several hr later by a slight but inconsistent increase. Mitosis was not inhibited when 3 simultaneous s.c. injections of 700 mg casein were given to 4-12-month-old rats. Increased mitosis, which occurred later than in young rats, was moderate and variable and was more pronounced in females than in males. Similar results were obtained with i.p. injections of casein. Mitosis remained unchanged in cells of the convoluted tubules of the kidney and of the exocrine pancreas after s.c. injection of 175 mg casein into 7-10-day-old rats. Results from autoradiographic studies made on 7-day-old rats indicate that cells which divide during periods of increased mitosis do not necessarily become binucleate. The production of binucleate cells appears to be linked in some way with the presence of factors inhibiting mitosis.

192 COMPARATIVE STUDY OF NITRAZEPAM METABOLISM IN PERFUSED ISOLATED LIVER OF LABORATORY ANIMALS. (E.) Bartošek, I. (Mario Negri Inst. Pharmacol. Res., Milan, Italy), J. Květina, A. Guaitani and S. Garattini. *Eur. J. Pharmacol.* 11(3):378-382, 1970.

The metabolism of nitrazepam and its 7-amino and 7-acetylamino derivatives was studied in isolated perfused livers of male Sprague-Dawley rats, male albino Swiss mice, white guinea pigs, and Fulvi di Borgogna rabbits. When added to the perfusion fluid in rat liver (final concentration of 50-100 μg/ml), the final product of nitrazepam metabolism was its 7-acetylamino derivative, but the total recovery of these 2 compounds from the perfusion liquid, liver homogenate, and bile accounted for only 10-15% of the nitrazepam originally added. No other metabolites could be found. In perfused mouse liver the end product of nitrazepam metabolism was its 7-amino derivative; 92% of the nitrazepam was converted into this derivative. Both the 7-amino and 7-acetylamino derivatives were recovered from perfused guinea pig and rabbit liver. These findings indicate that the 7-acetylamino and the 7-amino derivatives probably represent only minor pathways in the metabolism of nitrazepam.

193 EFFECT OF ADMINISTERING 8-AZAGUANINE AT VARIOUS TIMES ON LIVER ENZYME ACTIVITIES OF STARVED-REFED RATS. (E.) Szepesi, B. (US Dept. Agric. Res. Serv., Beltsville, Md.) and R. A. Freedland. *Proc. Soc. Exp. Biol. Med.* 135(3):709-712, 1970.

When male Sprague-Dawley rats were starved for 2 days and then refed a diet consisting of 65% glucose, glucose-6-phosphate dehydrogenase (G6PD) and decarboxylating malate dehydrogenase (DMD) activities were about twice the normal values. Administration of 8-azaguanine (7.5 mg i.p.) 12 or 24 hr before refeeding completely prevented the overshooting of normal values. Overshoot was partially prevented when the antimetabolite was given 30 hr after refeeding, but no effect was noted when it was injected 36 hr after refeeding. These findings suggest that increased de novo RNA synthesis only begins about 24 hr after refeeding. This hypothesis was tested by studying the effect of 8-azaguanine in cases in which the overshoot was present 4 days after refeeding. When injected 24 or 30 hr after refeeding the antimetabolite completely abolished increased G6PD and DMD activities, but only partial inhibition occurred when it was injected 48 hr after refeeding. Administration of 8-azaguanine (2 doses of 7.5 mg/day i.p.) for 2 days to ad libitum-fed rats reduced G6PD activity to about the same extent as in starved-refed rats but had no effect on DMD activity in ad libitum-fed rats. This suggests that de novo RNA synthesis necessary for increased enzyme activities is not entirely completed 48 hr after refeeding or that de novo RNA synthesis is completed within 48 hr after refeeding but 8-azaguanine reduces the level of functional RNA by interfering with the normal RNA turnover.

194 ACTION MECHANISM OF THE CHOLERETIC: THE PHENYL-N-AMYL MONOESTER OF CAMPHONIC ACID. (Fr.) Boucard, M. (Sch. Pharm., Montpellier, France), M. Reynier and J.-J. Serrano. *C. R. Soc. Biol. (Paris)* 164(1):97-102, 1970.

Administration of the sodium salt of the phenyl-n-amyl monoester of camphoric acid (PAC; 100 or 200 mg/kg/day p.o. for 1 month) to male Wistar rats produced an increase in bile flow which was proportional to the dose administered and which was greater than the increase produced by the same dose of dehydrocholic acid. Administration of 100-400 mg/kg/day of PAC p.o. for 7 days to adult male Wistar and Charles River rats increased the activities of glutamate dehydrogenase and glucose-6-phosphatase and decreased that of soluble acid phosphatase in vitro. In vivo PAC reduced the hexobarbital sleeping time, promoted detoxification of the sodium salt of 4-nitrobenzoic acid, and increased urinary excretion of urea. PAC had no effect on the activity of microsomal enzymes. These results suggest that the action of PAC is due to its effect on glucocorticoid metabolism since some of its effects are similar to those of hydrocortisone.

195 EFFECT OF ACETYLCHOLINE ON GLYCOGEN FORMATION AND THE ACTIVITY OF GLYCOGEN SYNTHETASE IN ISOLATED, PERFUSED RAT LIVER. (E.) Ottolenghi, C. (U. Ferrara Inst. Gen. Physiol., Italy), A. Caniato and O. Barnabei. *Nature (Lond.)* 229(5284):420-422, 1971.

When livers from male Wistar Glaxo rats were perfused with an amino acid solution containing neostigmine (0.25 mg/hr) and acetylcholine was infused at a constant rate (1 mg/hr), glycogen deposition increased and the output of glucose decreased. No significant change occurred in the rate of gluconeogenesis, but these changes were paralleled by enhanced activity of glycogen synthetase a and a small decrease in phosphorylase activity. Neostigmine alone had no effect. Cycloheximide reduced the rate of gluconeogenesis by about 70% and completely prevented glycogen accumulation. Treatment with acetylcholine and cycloheximide normalized gluconeogenesis but had no effect on glycogen formation. Carbamylcholine had essentially the same effect on glycogen formation as acetylcholine + neostigmine, but it did not change the output of glucose. Carbamylcholine increased both total glycogen synthetase and glycogen synthetase a activity. Neither acetylcholine or carbamylcholine caused glycogen accumulation in the absence of amino acids or in the presence of high glucose concentrations.

196 EFFECT OF BILE ON THYROXINE ABSORPTION IN THE RAT. (E.) Sinha, K. N. (U. Tennessee Med. Units, Memphis) and L. Van Middlesworth. *Am. J. Physiol.* 220(2):353-356, 1971.

When rat bile was mixed with ^{125}I- or ^{131}I-labeled L-thyroxine and/or L-triiodothyronine and fractionated on a sucrose-density gradient (2-20% sucrose) for 24 hr at 100,000 g, labeled conjugates with a molecular weight less than that of plasma albumin were recovered. In vivo studies were made of the effects of bile on the intestinal absorption of L-thyroxine and L-triiodothyronine in washed jejunal loops of random bred albino male rats. Within 2 hr, 37% of the thyroxine and 69% of the triiodothyronine were absorbed, and the addition of bile had little or no effect on absorption. Absorption of both hormones was retarded by rat plasma protein, but when both bile and plasma protein were present, the effect of plasma protein was reduced and thyroxine was absorbed almost as well as triiodothyronine. Dialysis experiments performed in vitro showed that addition of bile to a mixture of ^{125}I-labeled thyroxine and plasma increased the percentage of thyroxine which dialyzed out of the bag while either bile or plasma alone retarded thyroxine dialysis. These findings suggest that bile either contains a substance of low molecular weight which competes with plasma protein for thyroxine binding or that bile reduces the binding capacity of thyroxine with plasma protein.

197 REVERSIBLE INHIBITION BY CCl_4 OF BILE SECRETION DURING ISOLATED LIVER PERFUSION. (E.) Kaschnitz, R. (U. Vienna Inst. Gen. Exp. Path., Austria) and K. Mittermayer. *Experientia* 26(7):765-766, 1970.

The early effects of CCl_4 on bile secretion in isolated perfused rat livers were studied by visual estimation of drop frequency. About 3 min after the introduction of gaseous CCl_4 there was a sharp decrease in bile flow and 2-3 min later bile flow stopped completely. After a lag period of 2-10 min the bile flow accelerated to a maximum and returned to control values 30-50 min after CCl_4 treatment. Changes in bile flow produced by injection of 20 microliters of CCl_4 into the portal vein were less pronounced than when gaseous CCl_4 was used.

198 INDUCTION OF HEPATIC DRUG METABOLISM IN RATS BY METHYLCHLOROFORM INHALATION. (E.) Fuller, G. C. (U. Rhode Island Dept. Pharmacol., Kingston), A. Olshan, S. K. Puri and H. Lal. *J. Pharmacol. Exp. Ther.* 175(2):311-317, 1970.

Exposure of young, male Sprague-Dawley-derived rats and Swiss albino mice to an atmosphere containing 1,1,1-trichloroethane (2500-3000 ppm in an inhalation chamber) for 24 hr produced hepatic drug metabolism which varied according to pretreatment procedures. The concentration of trichloroethane in the liver was markedly greater than in the blood following 24 hr exposure. The duration of hexobarbital narcosis was decreased and the duration of action of meprobamate and zoxazolamine was increased (determined by loss of righting reflex), as was the metabolism by hepatic microsomal enzymes of hexobarbital, zoxazolamine and aminopyrene in vitro. Carbon monoxide binding pigment and NADP cytochrome c reductase activity were also increased. In the rats, pretreatment with cycloheximide and actinomycin D blocked the effects of trichloroethane on liver enzyme activity. Four-day pretreatment with morphine sulfate (20 mg/kg) or adrenalectomy did not prevent the observed effects of trichloroethane on hepatic drug metabolism. It is suggested that the increased drug-metabolizing enzymes after trichloroethane inhalation produced a new enzyme protein which could be used to detect toxic effects previous to the actual formation of lesions in the liver.

199 QUANTITATIVE AUTORADIOGRAPHIC STUDY OF THE HETEROGENEITY OF LIVER CELL PROLIFERATION AFTER PARTIAL HEPATECTOMY.

(Ger.) Rabes, H. (Univ. Pathol. Inst., Munich, Germany) and H. V. Tuczek. *Virchow. Arch.* [*Zellpathol.*] 6(4):302-312, 1970.

Cell proliferation and DNA synthesis was followed in the liver cells of 50 adult male Sprague-Dawley rats by autoradiography with ^{3}H-labeled thymidine after removal of 2/3 of the liver. The liver lobules were divided into 9-12 areas of equal size and the labeling index was determined in each of them. At 20 hr after partial hepatectomy cell proliferation and DNA synthesis reached a maximum in the peripheral 1/3 of the lobule and was not as pronounced in the 1/10 of the lobule adjacent to the portal field. At 27 hr after the operation DNA synthesis had extended toward the center of the lobule so that labeling indices near the central vein and in the periphery were the same. However, proliferation in the central 1/5 was still somewhat less rapid and only reached a maximum 34-40 hr after surgery when proliferation had decreased in the periphery. A second increase in DNA synthesis occurred 56 hr after partial hepatectomy. This increase also started at the periphery and fell off almost linearly toward the center. Differences in the sites of cell proliferation and DNA synthesis after partial hepatectomy are attributed to differences in the microenvironment within the liver lobules which are composed primarily of homogeneous liver cell populations.

200 FRACTIONATION OF RAT LIVER CHROMATINS: EFFECTS OF CATIONS, HEPATECTOMY AND ACTINOMYCIN D.

(E.) Dolbeare, F. (Eli Lilly Co., Indianapolis, Ind.) and H. Koenig. *Proc. Soc. Exp. Biol. Med.* 135(3):636-641, 1970.

Good resolution of the nuclear chromatin fractions in adult albino rat liver was obtained by differential centrifugation of clear sonicates in a 0.25-2.5 M linear sucrose gradient. Of the total DNA, 22± 4% was found in the diffuse chromatin, 10 ± 4% in the transitional chromatin, and 68 ± 5% in the dense chromatin. Diffuse chromatin incorporated RNA precursors (^{14}C-orotate and ^{14}C-adenine) 10-15 times more actively and contained 2-3 times more RNA, phospholipid, and nonhistone protein per unit of DNA than dense chromatin. Mg^{++} and Ca^{++} (0.001-0.003 M) caused diffuse chromatin to sediment with dense chromatin, apparently due to aggregation. Na^+ and K^+ (0.05 M) made dense chromatin more buoyant, possibly by dispersing it. At 12 hr after partial hepatectomy the diffuse chromatin content increased by 50%, and the incorporation of ^{14}C-orotate increased about 3-fold. A single dose of actinomycin D (1 mg/kg i.p. 16 hr before sacrifice) reduced the diffuse chromatin fraction by 65% and inhibited incorporation of ^{14}C-orotate into RNA by 70%.

201 INNER- AND OUTER-MEMBRANE ENZYMES OF MITOCHONDRIA DURING LIVER REGENERATION.

(E.) Gear, A. R. L. (U. Virginia Dept. Biochem., Charlottesville). *Biochem. J.* 120(3):577-587, 1970.

Mitochondria were isolated from the livers of male Sprague-Dawley rats which had undergone sham operations or partial hepatectomy 2-30 days before, and specific activities of marker enzymes for the mitochondrial matrix, inner membrane, intermembrane space, and outer membrane were determined. During liver regeneration no changes occurred in specific activities of marker enzymes for the matrix, inner membrane, and intermembrane space. The specific activities of 2 outer-membrane markers, monoamine oxidase and kynurenine hydroxylase, decreased significantly, reaching a minimum 3-4 days after partial hepatectomy and finally returning to normal after 3 weeks. Tryptophan pyrrolase assays and unsuccessful attempts to induce kynurenine hydroxylase by injecting rats i.p. with tryptophan demonstrated that decreases in kynurenine hydroxylase activity were not related to changes in tryptophan catabolism. These findings suggest that enzymes of the inner and outer mitochondrial membranes are synthesized asynchronously during morphogenesis and that enzymes can turn over independently of a membrane's existence. The specific activity of rotenone-insensitive, NADH cytochrome c reductase did not decrease significantly during the early stages of liver regeneration in intact mitochondria but did decrease significantly in highly purified outer membrane preparations. These results cannot be explained by microsomal contamination, but suggest that this enzyme is only loosely bound to the outer membrane. Electrophoresis on acrylamide gels showed that inner membrane proteins were essentially identical in controls and experimental animals 4 days after surgery. Outer membrane proteins, however, contained increased amounts of several high molecular weight components, 2 of which had mobilities identical with the proteins of smooth endoplasmic reticulum. These findings provide evidence that the mitochondria, at least the matrix, inner membrane, intermembrane space and possibly some form of primary outer membrane, turn over as a unit.

202 MICROBODY FORMATION IN REGENERATING RAT LIVER.

(E.) Rigatuso, J. L. (U. Minnesota Dept. Anat., Minneapolis), P. G. Legg and R. L. Wood. *J. Histochem. Cytochem.* 18(12):893-900, 1970.

The effect of 65% hepatectomy on the formation of new microbodies in the livers of male Sprague-Dawley rats was studied with electron microscopy and the peroxidase reaction for demonstrating catalase. An increase in the number of microbodies throughout the hepatic cell was detected as early as 12 hr after surgery, and they progressively increased in number until about 36 hr. At all time intervals, but especially during the early stages of recovery, small smooth-walled vesicles frequently were observed adjacent to mature microbodies. Membrane continuity was identified between vesicles and neighboring microbodies, and these organelles contained material similar in both appearance and endogenous peroxidase activity. The formation of new microbodies from pre-existing microbodies may be an important means of microbody proliferation.

203 ENZYME-HISTOCHEMICAL STUDIES OF THE LIVER REMNANT FOLLOWING PARTIAL HEPATECTOMY IN DOGS. (E.) Aronsen, K. F. (Malmo Gen. Hosp., Sweden), I. Hägerstrand, J. G. Nordén and B. Pihl. *Acta Chir. Scand.* 136(6): 521-527, 1970.

Liver biopsies and serum samples were obtained from 4 intact dogs and from 6 partially hepatectomized dogs before surgery and 1 day to 5 months afterwards. Only slight histochemical differences were found between biopsies from experimental animals and those from the controls. Pronounced vacuolization of the liver cells, which may be due to an increase in the number of fat globules, was detected 1-3 days after hepatectomy. A slight increase in acid phosphatase was noted during early regeneration. Alkaline phosphatase and, to a lesser extent, adenosine triphosphatase activities increased to about the same extent in hepatectomized animals and controls. These increases are attributed to anesthesia and surgical trauma. Serum bilirubin, alkaline phosphatase, SGOT, and γ-glutamyltranspeptidase activities were moderately elevated in hepatectomized dogs during the first week after surgery but remained unchanged in the controls.

204 EFFECTS OF PARTIAL HEPATECTOMY ON THE IMMUNE RESPONSE TO SHEEP RED CELLS. PRELIMINARY REPORT. (E.) Sakai, A. (U. Paris Necker Hosp.), C. N. Muller-Bérat, M. Debray-Sachs and M. C. Crevon. *Acta Pathol. Microbiol. Scand.* [*B*] 78B(5):652-654, 1970.

Immune response was studied in female Wistar rats given a single i.v. injection of sheep RBC before and after 70% hepatectomy. Hemolytic plaque-forming cells and rosette-forming cells increased markedly when partial hepatectomy was performed after immunization with sheep RBC. No significant changes occurred in serum hemolysin and hemagglutinin titers. This increased immune response after hepatectomy does not appear to be due to hepatectomy alone or to surgical stress since no increase occurred in antibody-producing cells of nonimmunized or sham-operated rats. Increases in plaque- and rosette-forming cells could be caused either by shortening of the generation time of these cells or by increased recruitment of their progenitors. Partial hepatectomy may either produce or release a short-acting stimulating factor or reduce serum levels of a factor which represses antibody synthesis. The uptake of DNA precursors was markedly reduced in thymocytes and increased in spleen cells 4 days after immunization and 1 day after hepatectomy.

205 DIRECT VASCULAR IMPLANTATION OF LIVER FOR HEPATIC REGENERATION AFTER INTERRUPTION OF THE PORTAL VEIN AND HEPATIC ARTERY. (E.) Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.) and J. Castillo. *Am. J. Surg.* 121(1):100-104, 1971.

In 40 splenectomized dogs the splenic vascular pedicle was implanted into the right lateral lobe of the liver and an end-to-side portacaval shunt was constructed. After 2-3 weeks 75-80% of the liver was removed, leaving only the right lateral lobe intact. The arterial blood flow into this lobe was then limited to the implanted splenic artery by double ligation of the common hepatic artery and the distal end of the hepatic arterial arch. Liver function studies, performed in the 9 dogs that survived both operations, returned to normal within 2-3 months. Liver regeneration was in progress 2 months after partial hepatectomy, and the only parenchymal liver change observed at this time was fatty degeneration which disappeared 6-12 months after hepatectomy. At this time irregular liver regeneration gave the liver a bizarre appearance, but gross examination showed it was essentially normal. In several dogs a thin rim of liver tissue adhered closely to the undersurface of the diaphragm. This tissue had no vascular channels to the diaphragm and thus does not represent an attempt by the liver to develop an extensive diaphragmatic circulation to aid liver regeneration. These findings suggest that portal venous flow is not necessary for liver regeneration. It is possible that liver regeneration, which occurred under these conditions in dogs, might prove clinically useful in some patients with tumors of the liver, gallbladder, or extrabiliary system who are currently considered inoperable.

206 STUDIES OF HEPATIC BLOOD FLOW AND HEPATIC FUNCTION AFTER LIGATION OF THE HEPATIC ARTERY AND PORTAL VEIN. (E.) Crook, J. N. (Louisiana State U. Sch. Med., New Orleans), M. F. Paris and F. C. Nance. *Am. Surg.* 26(12): 724-727, 1970.

All 3 branches of the hepatic artery were ligated in 22 mongrel dogs. After 1 month, the 18 survivors received end-to-side portacaval shunts; 8 of these dogs survived for 10-107 days. Very little change occurred in liver function. Blood ammonia and serum alkaline phosphatase increased progressively after hepatic artery ligation and portacaval shunt while total serum protein and serum albumin decreased. Increased SGOT values developing immediately after ligation tended to return to normal. At autopsy all the shunts were patent, portal blood was completely diverted from the liver, and no significant collateral blood flow to the liver occurred through the portal system. Almost all collateral blood flow to the liver flowed through branches of the celiac artery and superior mesenteric arteries. Hepatic effluent blood flow, measured in 3 dogs (average weight 12.3 kg), was 21.3 ml/kg/min, a value almost 2/3 that of the normal blood flow.

207 THE EFFECT OF HEPATIC ARTERY INFLOW ON REGENERATION, HYPERTROPHY, AND PORTAL PRESSURE OF THE LIVER FOLLOWING 50 PER CENT HEPATECTOMY IN THE DOG. (E.) Mizumoto, R. (Kyoto U. Med. Sch., Japan), M. Wexler, M. Slapak, Y. Kojima and W. V. McDermott, Jr. *Br. J. Surg.* 57(7):513-517, 1970.

Experiments performed in male and female mongrel dogs demonstrated that hepatic artery inflow has little effect on regeneration or function of the liver after hemihepatectomy. A 79.4% increase occurred in the weight of the remaining right half of the liver when blood vessels supplying the quadrate, left lateral, and left central lobes were ligated and this portion of the liver was removed, leaving hepatic artery inflow intact. Significant and persistent increases occurred in the portal pressure. A 91.1% increase occurred in the weight of the remaining left half of the liver when the common hepatic, gastroduodenal, and right gastric arteries and the right phrenic artery and ligament were ligated and transected prior to left hemihepatectomy. The remaining right half of the liver received its blood supply only by portal vein inflow. The differences in weight of the regenerating liver were not different in dogs with intact and interrupted hepatic artery inflow. The increase in portal pressure occurring after left hemihepatectomy was smaller and lasted only 2-4 weeks. In dogs in which the hepatic arterial inflow to the left half of the liver and portal vein supply to the right half of the liver were ligated, the right half of the liver atrophied while the left half became hypertrophic. Liver function tests were normal in all operated dogs except for a transient increase in SGOT which normalized 1 week after surgery. Liver biopsies were normal in hemihepatectomized dogs with interrupted hepatic artery inflow. Electron microscopic evidence of bile stasis was found in left lobes supplied by portal flow only, suggesting that the biliary system is more dependent on arterial supply.

208 PURINES: SUPPLY BY LIVER TO TISSUES. (E.) Pritchard, J. B. (Harvard Med. Sch., Boston, Mass.), F. Chavez Peon and R. D. Berlin. *Am. J. Physiol.* 219(5):1263-1267, 1970.

209 ADRENERGIC RECEPTORS FOR METABOLIC RESPONSES IN THE LIVER. (Rev.) (E.) Hornbrook, K. R. (Emory U. Dept. Pharmacodyn., Atlanta, Ga.). *Fed. Proc.* 29(4):1381-1385, 1970.

210 CHANGES IN THE COMPOSITION OF SERUM BETA LIPOPROTEINS IN RATS AFTER PARTIAL HEPATECTOMY AND ADRENALECTOMY. (E.) Husakova, A. (Charles U. Sch. Med., Hradec Kralove, Czechoslovakia) and J. Simek. *Physiol. Bohemoslov.* 19(1-2):95-100, 1970.

211 EFFECT OF SODIUM LEVORIN AND SODIUM NYSTATIN ON LIVER FUNCTION IN AN EXPERIMENTAL STUDY. (Rus.) Iarobkova, N. D. (Leningrad Inst. Antibiot., USSR). *Antibiotiki* 15(10):912-916, 1970.

212 THE EFFECT OF STARVATION ON CHANGES IN LIPID CONTENT AND DNA SYNTHESIS IN THE LIVER OF RATS AFTER PARTIAL HEPATECTOMY. (E.) Simek, J. (Charles U. Sch. Med., Hradec Kralove, Czechoslovakia), A. Husakova and F. Deml. *Physiol. Bohemoslov.* 19(1-2):101-106, 1970.

213 EFFECTS OF FEEDING STATES ON LIPID RADIOACTIVITY IN LIVER, MUSCLE AND ADIPOSE TISSUE AFTER INJECTION OF LABELLED GLUCOSE IN THE RAT. (E.) Bjorntorp, P. (U. Goteborg Sahlgrenska Hosp., Sweden), M. Krotkiewski, B. Larsson and Z. Somlo Szucs. *Acta Physiol. Scand.* 80(1):29-38, 1970.

214 METABOLISM OF ARTERIAL PLASMA ESTROGENS BY THE SPLANCHNIC ORGANS OF THE DOG IN VIVO. (E.) Collins, D. C. (Emory U. Dept. Med., Atlanta, Ga.), H. D. Robinson, C. M. Howard and J. R. K. Preedy. *J. Clin. Invest.* 49(12): 2324-2335, 1970.

215 TESTOSTERONE METABOLISM BY GASTROINTESTINAL MICROSOMES. (E.) Harri, M. P. (U. Turku Dept. Physiol., Finland), K. Hartiala, W. Nienstedt and H. A. Salmi. *Acta Physiol. Scand.* 79(4):537-540, 1970.

216 ROLE OF KIDNEY IN GLUCONEOGENESIS AND AMINO ACID CATABOLISM. (E.) Szepesi, B. (U. Calif. Sch. Vet. Med., Davis), E. H. Avery and R. A. Freedland. *Am. J. Physiol.* 219(6):1627-1631, 1970.

217 MEASUREMENT OF THE SIZE OF MICELLES: THE CASE OF SODIUM TAURODEOXYCHOLATE. (E.) Kratohvil, J. P. (Clarkson Coll. Technol. Dept. Chem., Potsdam, N. Y.) and H. T. Dellicolli. *Fed. Proc.* 29(4):1335-1342, 1970.

218 LIVER DETOXIFICATION. (Rev.) (Ger.) Clodi, P. H. (U. Ulm Intern. Med. Ctr., Germany). *Wien Med. Wochenschr.* 120(39):651-654, 1970.

219 EFFECTS OF INCREASED LIVER METABOLISM OF NICOTINE ON ITS UPTAKE, ELIMINATION AND TOXICITY IN MICE. (E.) Stalhandske, T. (Roy. Vet. Sch., Stockholm, Sweden). *Acta Physiol. Scand.* 80(2):222-234, 1970.

220 THE EFFECT OF EXERCISE ON THE VENOUS BLOOD AMMONIUM CONCENTRATION IN MAN. (E.) Sinniah, D. (Roy. Victoria Hosp., Belfast, Ireland), T. T. Fulton and H. McCullough. *J. Clin. Pathol.* 23(8):715-719, 1970.

221 BILIARY EXCRETION OF ANTIBIOTICS. (E.) Acocella, G. (Lepetit Pharmaceut. Co., Milan, Italy). *Tijdschr. Gastroenterol.* 13(3): 227-243, 1970.

222 STUDY OF OXYGENATION IN THE LIVER BY HYDROGEN PEROXIDE SOLUTIONS. II. IN VIVO STUDY OF HEPATIC TOLERANCE OF HYDROGEN PEROXIDE. (Fr.) Baillat, X. (Sch. Med., Montpellier, France) and J. Macabies. *J. Physiol. (Paris)* 62(Suppl. 2):238, 1970.

223 THE EFFECT OF BILE PIGMENTS ON THE EXCRETION OF C^{14}-TRIMOPHONIUM GLUCURONIDE. (E.) Calvey, T. N. (U. Liverpool Dept. Pharmacol. Therapeut., England) and D. J. E. Back. *Eur. J. Pharmacol.* 13(2):262-265, 1971.

224 PHYSIOLOGIC SURFACE ACTIVE AGENTS AND DRUG ABSORPTION. VIII: EFFECT OF BILE FLOW ON SULFADIAZINE ABSORPTION IN THE RAT. (E.) Nightingale, C. H. (State U. New York Sch. Pharm., Buffalo), J. E. Axelson and M. Gibaldi. *J. Pharm. Sci.* 60(1):145-147, 1971.

225 METABOLIC PATHWAYS OF BILE ACID FORMATION IN THE RAT. (E.) Javitt, N. B. (Cornell U. Med. Coll., New York, N. Y.) and S. Emerman. *Mt. Sinai J. Med.* 37(4):477-481, 1970.

226 RECENT ADVANCES IN BILIRUBIN FORMATION, TRANSPORT, METABOLISM AND EXCRETION. (Rev.) (E.) Fleischner, G. (Albert Einstein Coll. Med., Bronx, N. Y.) and I. M. Arias. *Am. J. Med.* 49(5):576-589, 1970.

227 EFFECT OF MUSCULAR ACTIVITY ON BILE ACID EXCRETION IN RATS. (E.) Malinow, M. R. (Oregon Reg. Primate Res. Ctr., Beaverton), P. McLaughlin, A. Perley, and L. Laastuen. *J. Appl. Physiol.* 29(5):610-614, 1970.

228 MECHANISM OF BILIRUBINURIA INDUCTION BY EXOGENOUS NONCONJUGATED BILIRUBIN IN DOGS. (Fr.) Barac, G. (U. Liege Lab. Physiopathol., Belgium) and K. Heirwegh. *J. Physiol. (Paris)* 62(Suppl. 2):239, 1970.

229 BILIARY EXCRETION OF BROMSULPHTHALEIN DURING LONG-TERM EXPERIMENTS IN RATS. (Fr.) Bel, C. (Sch. Med., Lille, France), N. Trupin and J. Vanlerenberghe. *J. Physiol. (Paris)* 62(Suppl. 2):242, 1970.

See also numbers: 187, 274

INTESTINE

230 INSOLUBLE HEXOKINASE IN THE BRUSH BORDER REGION OF RAT INTESTINAL EPITHELIAL CELLS. (E.) van den Berg, J. W. O. (Rotterdam Med. Sch., Netherlands) and W. C. Hülsmann. *FEBS Letters* 12(3):173-175, 1971.

Purified brush border preparations from the rat intestine were shown to be free of contamination from mitochondrial material because of their lack of cytochrome c oxidase. However, these preparations did have hexokinase activity. The Michaelis constants for this enzyme were 10^{-4} M for glucose and 1.8×10^{-4} M for ATP. The V_{max} for glucose phosphorylation was calculated to be 9.2 mU/mg protein at 20C. Using 2 different disruption techniques, it was demonstrated that most of this hexokinase activity was structurally-bound while 10% was soluble or solubilized. Alkaline phosphatase was not solubilized. Particulate hexokinase and alkaline phosphatase activities were shown to be present in different structures of the brush border by subfractionation of disrupted brush borders followed by density gradient centrifugation on glycerol. The fraction obtained was high in alkaline phosphatase activity and low in hexokinase activity.

231 STUDIES ON THE EFFECT OF SOME BROAD SPECTRUM ANTIBIOTICS ON SMALL INTESTINAL OLIGOSACCHARIDASES AND ABSORPTION OF LACTOSE. (E.) Sharma, A. K. (Indian Inst. Exp. Med., Calcutta) and A. C. Majumdar. *Jap. J. Exp. Med.* 40(4):221-225, 1970.

The effect of chlortetracycline hydrochloride, chloramphenicol, and oxytetracycline hydrochloride was studied in rat small intestinal mucosal carbohydrases in vitro. Chlortetracycline inhibited lactase, sucrase, and maltase activities by 81%, 61%, and 23%, resp. Chloramphenicol inhibited lactase and sucrase activities 50% and 29% resp., while oxytetracycline had very little inhibitory effect. Administration of chloramphenicol or chlortetracycline hydrochloride (15 mg/kg, p.o. twice daily) for 10 days markedly reduced the rise of blood glucose caused by a lactose meal in rabbits. A deficiency of some of the disaccharidases may be caused by the inhibitory effect of broad spectrum antibiotics studied. This inhibition may also lead to malabsorption of lactose and other sugars and result in diarrhea.

232 IN VIVO AND IN VITRO STUDY OF THE INTESTINAL AND HEPATIC N-OXIDATION OF N,N-DIETHYLNICOTINAMIDE (NIKETHAMIDE). (Fr.) Chambon-Mougenot, R. (Sch. Med. Pharm., Lyon, France), M. Riotte, J. Bringuier and P. Chambon. *C. R. Soc. Biol. (Paris)* 164(4):856-860, 1970.

When N,N-diethylnicotinamide was administered to Wistar rats (50 mg i.p. or 100 mg p.o.), urinary excretion of its N-oxide was about the same with both routes of administration but, contrary to expectation, this metabolite was excreted more rapidly after p.o. administration. In vitro experiments, in which rat liver homogenate was incubated with 50 mg of N,N-diethylnicotinamide in Krebs solution, yielded only 0.8 mg of the N-oxide (1.6% of the original substrate), indicating that little of the drug is metabolized in the liver. In vitro experiments with rat small intestine demonstrated that metabolism of the drug was not due to bacterial metabolism by the flora, but to an osmotic phenomenon with transport across the intestinal wall. Oxygen was necessary for the formation of the N-oxide. The infrared spectrum of the N-oxide of N,N-diethylnicotinamide, isolated by paper chromatography, was almost identical with that of the synthetic N-oxide.

233 DOSE RESPONSE OF JEJUNAL SUCRASE AND MALTASE ACTIVITIES TO ISOCALORIC HIGH AND LOW CARBOHYDRATE DIETS IN MAN. (E.) Rosenswig, N. S. (Fitzsimons Gen. Hosp., Denver, Colo.) and R. H. Herman. *Am. J. Clin. Nutr.* 23(11):1373-1377, 1970.

234 ASSOCIATIONS OF INDIGENOUS MICROORGANISMS WITH GASTROINTESTINAL MUCOSAL EPITHELIA. (E.) Savage, D. C. (U. Texas Dept. Microbiol., Austin). *Am. J. Clin. Nutr.* 23(11):1495-1501, 1970.

235 CIRCADIAN RHYTHM OF OXYGEN CONSUMPTION AND COLON TEMPERATURE IN WHITE RATS. (Fr.) Kayser, C. (CNRS Lab. Physiol. Resp., Strasbourg/Cronenbourg, France). *C. R. Soc. Biol. (Paris)* 164(3):641-644, 1970.

236 EFFECT OF INTESTINAL HORMONES ON DISACCHARIDASE ACTIVITY IN HUMAN DUODENAL SECRETION. (Ger.) Bohmer, R. (U. Ulm Intern. Med. Ctr., Germany) and K. Rommel. *Klin. Wochenschr.* 48(20):1226-1233, 1970.

237 EFFECT OF DUODENAL HORMONES ON FOOD CONSUMPTION BY INTACT AND VAGOTOMIZED RATS. (Rus.) Zabolotnykh, V. A. and A. M. Ugolev. *Dokl. Akad. Nauk SSSR* 194(2):468-470, 1970.

See also numbers: 628, 829

238 THE ROLE OF BETA-RECEPTORS IN THE REGULATION OF THE ARTERIAL CIRCULATION OF THE LIVER. (E.) Fischer, A. (Univ. Med. Sch., Budapest, Hungary), L. Takács, P. Bemcsáth and L. Vaslaki. *Acta Hepatosplenol. (Stuttg.)* 17(6): 411-415, 1970.

A study was made of the effects of the beta-adrenergic agent, isoproterenol, and the beta-adrenergic blocking agent, propranolol, on hepatic artery circulation in 12 dogs before, during, and after shunting of blood from the portal vein into the femoral vein. Blood flow in the hepatic artery increased significantly before shunting when isoproterenol (0.3-5 μg/kg/min) was infused i.v. into 4 dogs; no further increase occurred when the shunt was opened. This is explained by maximal dilation of the hepatic artery before shunting. In 5 of 11 experiments i.v. administration of propranolol (0.2-0.5 mg/kg) failed to change blood flow in the hepatic artery, either before or during shunting. In 6 other experiments hepatic blood flow increased during shunting despite administration of propranolol (2 mg/kg i.v.). These findings confirm the presence of beta-receptors in the hepatic artery. However, post-shunting dilation of the hepatic artery is due to other factors than beta-receptor stimulation.

239 CHANGES IN COAGULATION FACTORS AFTER HEPATIC ARTERY LIGATION IN DOGS. (E.) Bengmark, S. (Sohlgren Hosp., Goteborg, Sweden), L. O. Hafström, K. Korsan-Bengtsen and B. Loughridge. *Acta Hepatosplenol. (Stuttg.)* 17(6):398-402, 1970.

Various blood clotting parameters were investigated in 3 dogs after hepatic artery ligation and in 2 sham-operated dogs. After hepatic artery ligation the activity of ornithine carbamoyl transferase increased significantly, fibrinogen activity increased slightly, and the activities of factors II, VII, and X decreased slightly. No significant changes occurred in factor V or plasminogen activity, the recalcification time of citrated plasma, and partial thromboplastin time. Changes observed in the blood clotting parameters in dogs after hepatic artery ligation are not nearly so pronounced as those occurring in humans after hepatic dearterialization. These findings provide no evidence that intravascular coagulation occurs or that liver protein synthesis is significantly decreased in dogs following occlusion of the hepatic artery.

240 PLASMA SKIMMING IN THE INTESTINAL TRACT. (E.) Jodal, M. (U. Goteborg, Sweden) and O. Lundgren. *Acta Physiol. Scand.* 80(1):50-60, 1970.

^{51}Cr-labeled RBC and ^{125}I-labeled human serum albumin were used to determine the "tissue hematocrit" in the layers of the small and large intestine in 34 fasted, chloralose-anesthetized cats. Determinations were made during resting blood flow in the denervated intestine, during vasodilation induced with isopropylnorepinephrine (5-10 μg/min), and during vasoconstriction produced by nerve stimulation. The tissue hematocrit was calculated from the arterial hematocrit and the distribution of ^{51}Cr and ^{125}I in the tissue and blood. In the small intestine the tissue hematocrit of the mucosa was only 50-60% of the arterial hematocrit while the tissue hematocrit of the muscularis layer was 90% of arterial values. Similar results were obtained under all 3 experimental conditions. The low tissue hematocrit of the mucosa cannot be explained by extravascular accumulation of ^{125}I-labeled albumin or by regional differences in the extent of axial streaming by RBC. These findings suggest that plasma skimming (cell separation) occurs in the small intestine of the cat. This hypothesis is supported by the abolition of differences in the tissue hematocrit by mechanically reducing total intestinal blood flow. In the colon the tissue hematocrit of the mucosa was only slightly lower than that of the submucosa, the muscularis layer, and the arterial blood, indicating that little or no plasma skimming occurs there.

241 HEAT-LABILE NATURAL ANTI-DIGESTIVE ANTIBODIES IN ANIMALS. (E.) Zweibaum, A. (Broussais Hosp., Paris). *Experientia* 26(9): 1005-1006, 1970.

By using the indirect fluorescent antibody method, sera from various species of animals were tested for heat-resistant and heat-labile antibodies for autologous, isologous, and heterologous colon, small intestine, and stomach. Tests were run on sera from 400 Wistar, Long Evans, Fischer inbred, and Fischer inbred germ-free rats; 100 healthy rabbits; and 200 healthy mongrel dogs. Sera from 200 blood donors and sera and colons from 40 patients without digestive disease were also tested. Both rats and rabbits, but not dogs or man, had heat-labile antibodies which reacted with goblet cells of autologous, isologous, and heterologous tissue. These antibodies disappeared after sera had been heated to 56C for 30 min. In rabbit sera some staining of isologous and heterologous tissue persisted after heating, indicating that both heat-labile and heat-resistant antibodies were present.

242 PHARMACOLOGIC AND BIOCHEMICAL ASPECTS OF DIGESTION AND ABSORPTION IN THE GASTROINTESTINAL TRACT. (Rev.) (Ger.) Waser, P. G. (U. Zurich Pharmacol. Inst., Switzerland). *Pharm. Acta Helv.* 45(10):589-613, 1970.

243 HEPATIC SURVIVAL BY VASCULAR IMPLANTATION FOLLOWING INTERRUPTION OF PORTAL

VENOUS AND HEPATIC ARTERIAL FLOW. (E.) Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.) and J. Castillo. *Surg. Gynecol. Obstet.* 131(6): 1105-1108, 1970.

244 PATHOPHYSIOLOGICAL EFFECTS OF BOWEL DISTENTION ON INTESTINAL BLOOD FLOW. (Rev.) (E.) Tunick, P. A. (Montefiore Hosp. Med. Ctr., Bronx, N. Y.), W. F. Treiber, Jr. and M. Frank. *Curr. Top. Surg. Res.* 2:59-69, 1970.

245 INTESTINAL VASOCONSTRICTION AFTER HEMORRHAGE: ROLES OF VASOPRESSIN AND ANGIOTENSIN. (E.) McNeill, J. R. (U. Manitoba Dept. Pharmacol. Therapeut., Winnipeg, Canada), R. D. Stark and C. V. Greenway. *Am. J. Physiol.* 219(5):1342-1347, 1970.

246 EFFECTS OF SODIUM AND CHLORIDE IONS ON THE ELECTROPHYSIOLOGICAL PROPERTIES OF PORTAL VEIN MUSCLE CELLS. (Rus.) Taranenko, V. M. (A. A. Bogomoletz Inst. Physiol., Kiev, USSR) and M. F. Shuba *Fiziol. Zh.* 56(8):1149-1156, 1970.

247 SPONTANEOUS ELECTRICAL ACTIVITY IN SMOOTH MUSCLE CELLS OF THE PORTAL VEIN. (Rus.) Gurkovskaia, A. V. (Bogomoletz Inst. Physiol., Kiev, USSR). *Fiziol. Zh. SSSR* 56(8): 1157-1163, 1970.

248 INTRACELLULAR RECORDING OF NORMAL SPONTANEOUS ACTIVITY OF GUINEA PIG PORTAL VEIN. (Ger.) Golenhofen, K. (Univ. Physiol. Inst., Marburg/Lahn, Germany) and D. Von Loh. *Pfluegers Arch.* 319(1):82-100, 1970.

249 ANGIOTENSINOGEN CONTENT IN THE BLOOD OF THE HEPATIC VEIN. (E.) Dauda, G. (Univ. Med. Sch., Debrecen, Hungary), M. Szokol and I. Devenyi. *Acta Physiol. Acad. Sci. Hung.* 37(3/4):233-236, 1970.

250 HEPATIC VASCULAR BED. (Rev.) (E.) Greenway, C. V. (U. Manitoba Med. Sch., Winnipeg, Canada) and R. D. Stark. *Physiol. Rev.* 51(1):23-65, 1971.

251 COMBINED EFFECT OF CAROTID SINUS HYPOTENSION AND DIGESTION ON SPLANCHNIC CIRCULATION. (E.) Fronek, A. (U. California Sch. Med., La Jolla). *Am. J. Physiol.* 219(6): 1759-1762, 1970.

252 ADRENERGIC INNERVATION OF THE SMALL VESSELS IN THE PANCREAS OF THE RAT AND CHANGES OBSERVED DURING EARLY RENAL HYPERTENSION. (E.) Graham, J. D. P. (Welsh Natl. Sch. Med., Cardiff), J. D. Lever and T. L. B. Spriggs. *Circ. Res.* 27(Suppl. 2):25-32, 1970.

253 AIR DRINKING AND THE MEASUREMENT OF THIRST. (E.) Oatley, K. (U. Sussex Lab. Exp. Psychol., Brighton, England) and A. Dickinson. *Anim. Behav.* 18(2):259-265, 1970.

254 PHYSIOLOGY OF GASES IN THE DIGESTIVE TRACT LUMEN. NEW CONCEPTS. (Fr.) Doreau, J. L. (Tenon Hosp., Paris, France) and J. Sallet. *Progr. Med. (Paris)* 98(13-14):237-246, 1970.

See also numbers: 206, 207

255 A NEW FIBEROPTIC ESOPHAGOGASTROSCOPE. (E.) Lo Presti, P. A. (Queens Hosp. Ctr., Jamaica, N. Y.), P. S. Cifarelli, N. Dixit and M. Kasinathan. *Am. J. Dig. Dis.* 16(1):31-37, 1971.

A new fiberoptic esophagogastroscope is described which was used to perform 169 esophagoscopies in 150 patients and 164 gastroscopies in 150 patients. The esophagus was completely visualized in all cases and lesions identified included esophagitis (43 cases), hiatus hernia (15 cases), esophageal varices (18 cases), esophageal cancer (4 cases), achalasia (2 cases), and Mallory-Weiss syndrome (1 case). Excellent views of the stomach were obtained in 145 of 150 patients. Because of lower esophageal obstructions, the instrument could not be passed into the stomach in 5 cases. The pylorus was identified in all patients, but the fundus could not be viewed with this instrument. Gastric lesions identified with this technique were hyperemic, edematous mucosa (40 cases), hemorrhagic gastritis (10 cases), gastric ulcers (24 cases), gastric polyps (7 cases), gastric cancer (8 cases), and subtotal gastrectomies (11 cases). A presumptive diagnosis of duodenal ulcer was made in 15 patients with active upper gastrointestinal bleeding and negative esophagogastric findings. This diagnosis was radiologically confirmed in 10 cases and surgically confirmed in 5. The duodenum was visualized in 2 cases. All patients tolerated these examinations well and no endoscopic accidents occurred. A longer version of the fiberoptic esophagogastroscope makes it possible to routinely visualize the duodenal bulb.

256 A CLINICAL DIAGNOSTIC INDEX IN THE DIAGNOSIS OF THE DUMPING SYNDROME. CHANGES IN PLASMA VOLUME AND BLOOD SUGAR AFTER A TEST MEAL. (E.) Sigstad, H. (Ringerike Hosp., Honefoss, Norway). *Acta Med. Scand.* 188(6): 479-486, 1970.

After a test meal of 175 ml of a 50% glucose solution a clinical diagnostic index was used to diagnose the dumping syndrome in 49 partially gastrectomized patients. Sleepiness, dizziness, and restlessness were frequent syndromes among dumpers. Bilious vomiting, a component of the afferent loop syndrome was found in 4 dumpers. Statistically significant differences were observed between dumpers and non-dumpers regarding the mean values of the percentage fall in plasma volume. An increasing fall in plasma volume generally paralleled a rising clinical diagnostic index. The fall in plasma volume generally coincided in time with the patient's symptoms. Dumpers showed a more rapid rise and higher maximal values of the blood sugar index than non-dumpers. All patients with a fall in plasma volume of more than 15% were dumpers. In women the plasma volume decreased more and the clinical diagnostic index was higher than in men.

257 A TECHNIQUE FOR ASSESSING PYLORIC REFLUX. (E.) Grech, P. (Northern Gen. Hosp., Sheffield, England). *Gut* 11(9): 794-795, 1970.

Pyloric reflux was assessed in normal controls and in patients with gastric and duodenal ulcers and chronic alcoholic gastritis by having them swallow a fine rubber tube with a bullet-shaped mercury balloon so that it passed into the duodenum. Air was injected to ascertain correct positioning and this was followed by injection of a weak barium solution. Observations were made with subjects in erect and supine positions. Rapid serial fluorography confirmed that the pylorus was competent in 11 of the 12 controls. Since quantitative measurement of the amount of pyloric regurgitation was impractical, it was graded only as mild, moderate, or marked. Two distinct types of regurgitation were noted: systolic regurgitation, synchronous with retroperistaltic waves, in patients with gastric ulcer and gastritis and a "leak" due to fibrosis and scarring of the pyloric region in patients with duodenal ulcers. The latter type of regurgitation did not appear to be related to duodenal peristalsis. Reflux was more pronounced when gastric ulcer and gastritis patients were examined in a standing position.

258 COMPARISON OF DOSE-RESPONSE CURVES WITH SUBCUTANEOUS AND INTRAVENOUS HISTAMINE. (E.) Desai, H. G. (B. Y. L. Nair Charitable Hosp., Bombay, India), M. P. Zaveri and F. P. Antia. *Gastroenterology* 59(5):701-706, 1970.

Dose-response curves were obtained from 16 patients with duodenal ulcers and from 13 controls with no gastrointestinal symptoms by injecting histamine acid phosphate s.c. (2.0, 2.4, 2.8, and 3.2 mg) and i.v. (1.6, 2.0, 2.4, and 2.8 mg/hr). No significant differences were found in the average maximum acid outputs obtained by these 2 methods and good correlations were observed between results of the s.c. and i.v. histamine tests in both groups of subjects. Maximum acid secretion was obtained with 2.8 mg of histamine acid phosphate s.c. or with 2.0 mg/hr i.v.

259 A COMPARISON OF RESULTS OF THE AUGMENTED HISTAMINE TEST WITH AND WITHOUT DIALYSIS IN GASTRECTOMIZED PATIENTS WITH SPECIAL REFERENCE TO THE DIAGNOSIS OF RECURRENT PEPTIC ULCER. (E.) Fenger, H. J. (Natl. Hosp., Copenhagen, Denmark) and P. Aagård. *Acta Chir. Scand.* 136(6):503-507, 1970.

In 38 gastrectomized patients (10 women and 21 men, aged 27-69 yr), 18 of whom had recurrent peptic ulcers, a close correlation was found between maximal acidities obtained in Kay's histamine test and in a histamine test employing a dialysis balloon. Values obtained in the histamine test with a dialysis balloon are significantly higher than those in Kay's histamine test. These differences may be due either to loss of gastric secretion via the anastomosis or to differences in regurgitation of bile and pancreatic juice. In patients with recurrent peptic ulcers the mean values of these 2 tests were almost identical. Since the upper normal limit is far more clear-cut in the histamine test with dialysis, this method is recommended for the diagnosis of recurrent peptic ulcers. Maximal acidity values were not correlated with the site of the recurrent ulcer.

260 THE SELECTIVE NERVE STAIN LEUCOMETHYLENE BLUE AS AN INTRAOPERATIVE AID TO ACHIEVING COMPLETE VAGOTOMY. (E.) Frimer, M. L. (U. British Columbia Vancouver Gen. Hosp., Canada), M. M. Cohen, R. C. Harrison and I. B. Holubitsky. *Gut* 11(10):881-882, 1970.

With the leucomethylene blue method nerve tissue was found in only 30 of 101 specimens removed from 20 patients undergoing vagotomy for peptic ulcers. According to Hollander's criteria postoperative insulin tests, performed on 17 of these patients, were negative in 13 cases and positive in 4. Difficulties in exposing the posterior esophagus were encountered in 3 of the 4 patients with incomplete vagotomies. The leucomethylene blue method is considered to be an unreliable technique for ensuring complete vagotomy at the time of surgery.

261 FECAL FAT AND NITROGEN IN HEALTHY CHILDREN AND IN CHILDREN WITH MALABSORPTION OR MALDIGESTION. (E.) Shmerling, D. H. (Univ. Pediat. Hosp., Zurich, Switzerland), J. C. W. Forrer and A. Prader. *Pediatrics* 46(5):690-695, 1970.

Daily fecal excretion of total fatty acids and nitrogen was compared in 71 infants and children, aged 3 months to 17 yr, with gastrointestinal diseases (50 with celiac disease, 11 with exocrine pancreatic insufficiency, 2 with Crohn's disease, 1 with protein-losing enteropathy, and 2 with congenital biliary atresia) and in 71 controls in the same age range without gastrointestinal disease. Fecal fat outputs were more than 3.1 g/day in all but 2 patients with celiac disease and exceeded 4 g/day in 11 cases. Only about half the children with celiac disease had elevated fecal nitrogen values. No correlations were found between age and the degree of steatorrhea or fecal nitrogen excretion. Both fecal fat and fecal nitrogen outputs were elevated in all but 1 patient with exocrine pancreatic insufficiency; the highest values found occurred in this group of patients, and both fat and nitrogen values tended to increase with age. Both fecal fat and fecal nitrogen outputs were normal in the 2 patients with Crohn's disease. No steatorrhea was found in the patient with protein-losing enteropathy but fecal nitrogen was 2.1 g/day. Pronounced steatorrhea without increased fecal nitrogen was found in both patients with biliary atresia. Among the controls fecal fat values were somewhat higher in infants than in older children and increased in the adolescent group. Fecal nitrogen values increased steadily with age. These findings suggest that fecal nitrogen is useful as an approximate index of protein digestion and that, in combination with fecal fat determinations, it might help in differentiating between patients with various forms of malabsorption and maldigestion, providing age and diet are taken into account.

262 FINGERPRINT CHANGES IN COELIAC DISEASE. (E.) David, T. J. (Bristol Roy. Infirm., England), A. B. Ajdukiewicz and A. E. Read. *Br. Med. J.* 4(5735):594-596, 1970.

Of 73 patients (25 males and 48 females) with celiac disease confirmed by jejunal biopsy, 10 (7 children) had normal fingerprint patterns and 63 had abnormal fingerprints. These abnormalities, which ranged from moderate epidermal ridge atrophy to complete loss of fingerprint patterns, were found in only 3 of 485 controls; 2 of these controls had biliary cirrhosis and 1 had chronic active hepatitis. In general, improvements in fingerprint patterns paralleled clinical improvements and deteriorations in fingerprint patterns seemed to precede clinical deterioration by several weeks. It is suggested that these fingerprint abnormalities might be used to diagnose adult celiac disease and to evaluate response to a gluten-free diet. If fingerprint changes correlate closely with villous atrophy in the intestine, fingerprinting might also be substituted for repeated biopsies of the small intestine.

263 PERORAL INTESTINAL MUCOSAL BIOPSIES IN INFANTS AND CHILDREN. (E.) Shmerling, D. H. (Univ. Dept. Pediat., Zurich, Switzerland). *Helv. Paediatr. Acta* Suppl. 22:1-42, 1970.

In 367 attempts to obtain peroral intestinal suction biopsies from 167 infants and children with clinical findings suggestive of malabsorption it was demonstrated that significantly more successful biopsies (94.4%) were obtained with a modified pediatric Watson capsule than with a Brandborg-Rubin-Quinton multipurpose biopsy tube (82.3%). More than half of the biopsies obtained with the pediatric Watson capsule were from the proximal jejunum, but only 9 of 130 could be obtained from this region with the Brandborg tube. No serious complications developed after the use of either of these procedures, but the adult Watson capsule perforated the proximal jejunum of a 3-yr-old girl and was not used thereafter. Dissecting microscope examination of 418 intestinal biopsy specimens from 217 infants and children with malabsorption revealed 3 basic patterns: (1) slender villi and villi with high ridges, (2) low ridges and flat convolutions, and (3) flat mucosa. Of 106 specimens from patients with active celiac disease, 88 had a flat mucosa with a mosaic pattern, 13 had a completely flat mucosa, and 6 had a flat mosaic pattern adjacent to very flat convolutions. Flat mucosa was also found in 4 patients who did not have celiac disease. The entire spectrum of mucosal changes was found in 165 patients with celiac disease who were under treatment with a gluten-free diet. In most cases no essential differences were found between biopsies from the distal duodenum and those from the proximal jejunum.

264 USE OF A STANDARD FATTY MEAL AS A TEST FOR FAT ABSORPTION. (E.) Penfold, W. A. F. and W. M. Keynes (Radcliffe Infirm., Oxford, England). *Ann. Surg.* 173(1):157-163, 1971.

Serum esterified fatty acid levels were measured in 34 patients with malabsorption syndrome (11 with normal fecal fat excretion, 23 with steatorrhea) and 20 normal controls. Values were determined before and 2 and 4 hr after a standardized test meal of 100 g of fat. No significant rise (6-45 mg/100 ml) in serum lipid levels occurred after administration of the test meal to the 23 patients with steatorrhea, while increases of 88 and 90 ml/100 ml, resp., were seen in the other 11 patients and 20 controls. Reproducibility of the results was confirmed with duplicate and triplicate tests, and it was concluded that a rise in serum lipid levels over 90 mg/100 ml after a test meal shows absorption in the normal range, whereas values less than this indicate impaired intestinal fat absorption. Further testing in patients with gluten-induced enteropathy, total pancreatectomy, chronic pancreatitis, indigestion, and Crohn's disease of the small intestine support the tolerance test method. One exception, in a 53-yr-old diabetic man with chronic pancreatitis and steatorrhea, is attributed to poor plasma clearance of lipid due to the diabetes. It is recommended that the tolerance test be used instead of fecal fat determinations because it eliminates the unpleasantness of handling and analysis, is faster, and eliminates possible imcomplete fecal collections. A disadvantage is that this indirect test has the inaccuracies found in all similar tolerance tests.

265 CARCINOEMBRYONIC ANTIGEN ASSAY IN CANCER OF THE COLON AND PANCREAS AND OTHER DIGESTIVE TRACT DISORDERS. (E.) Moore, T. L., H. Z. Kupchik, N. Marcon and N. Zamcheck (Mallory Inst. Pathol., Boston, Mass.). *Am. J. Dig. Dis.* 16(1):1-7, 1971.

Sera from 279 selected patients with benign and malignant diseases of both gastrointestinal and non-gastrointestinal origin were tested for the presence of carcinoembryonic antigen (CEA). CEA was detected in the sera of all 13 patients with pancreatic carcinoma, 32 of 35 patients with colonic carcinoma, and 6 of 14 patients with other gastrointestinal cancers. Positive assays were also observed in 24 of 46 patients with alcoholic liver disease, 7 of 13 patients with uremia, and 6 of 8 patients with bronchogenic carcinomas. Sera from all 40 controls were negative for CEA. The assay may be useful in predicting residual tumor after colonic resection and in detecting adenocarcinoma of the pancreas, but the assay must be interpreted cautiously in patients with alcoholic liver disease or with renal failure.

266 DETERMINATION OF PANCREATIC AMYLASE ACTIVITY BY A RADIAL DIFFUSION ASSAY. (E.) Bélanger, A. (U. Sherbrooke Sch. Sci., Quebec, Canada), J. Perreault, Y. Couture and J. Dunnigan. *Can. J. Physiol. Pharmacol.* 48(11): 758-761, 1970.

Amylase activity was determined in pancreatic homogenates from fed rats and from rats with insulin hypoglycemia by radial diffusion in agar gel and by colorimetric determination of the optical density of a starch-iodine complex used to determine the amount of starch digested. Results showed that the starch-iodine method can be used over a fairly limited range of activities, while the agar diffusion method can be used over a very wide range where there is a linear relation between the enzyme concentration and the diameter of the reaction zone. The agar diffusion method is recommended for routine determinations of pancreatic amylase because of its simplicity and rapidity.

267 THE INTERRELATIONSHIPS OF PANCREATIC ENZYMES IN HUMAN DUODENAL ASPIRATE. (E.) Goldberg, D. M. and K. G. Wormsley (Maryfield Hosp., Dundee, Scotland). *Gut* 11(10):859-866, 1970.

Amylase, trypsin, chymotrypsin, and proteolytic enzyme activities were measured in duodenal juice from 20 patients with chronic duodenal ulcer, 13 patients 3-6 weeks or more than 4 months after acute pancreatitis, 10 patients with chronic pancreatitis, 7 patients with anicteric pancreatic carcinoma, and 16 normal controls after i.v. infusion of secretin (0.25 or 2.0 CU/kg hr) or a combination of secretin (0.25 CU/kg hr) and pancreozymin (16 CHRU/kg hr). While the relation of trypsin to chymotrypsin was independent of enzyme output, the type of stimulation, and the presence of pancreatic disease, the ratio of proteolytic enzymes to amylase increased when pancreatic stimulation was increased by using the larger dose of secretin or the combination of secretin and pancreozymin. Proteolytic enzyme secretion was more severely impaired than amylase secretion in patients with chronic pancreatitis or recent attacks of acute pancreatitis. It is recommended that both proteolytic and nonproteolytic enzymes be measured in routine tests of pancreatic function since an abnormal ratio may be of diagnostic significance; information obtained from determinations of both groups of enzymes makes less likely misinterpretation of isolated defects in secretion or the failure of proteolytic enzyme precursors to be activated.

268 PROPOSED SPOT-TEST FOR PRONOUNCED HYPERAMYLASEMIA. (E.) Fridhandler, L., J. E. Berk (U. California Coll. Med., Irvine) and S. Take. *Am. J. Dig. Dis.* 15(11):1039-1041, 1970.

Filter paper impregnated with dimethylsulfoxide and with amylopectin covalently bound to Remazol brilliant blue R was slightly decolorized by sera containing 160 Simogyi units (SU) of amylase and was distinctly decolorized by sera containing 496 SU or more. Although the degree of decolorization is not always proportionate to serum amylase activity and it is not possible to make quantitative determinations, this spot test appears to offer a simple and rapid method for detection of pronounced hyperamylasemia.

269 EVALUATION OF PANCREATIC SCANNING. (E.) Liewendahl, K. (Univ. Cent. Hosp., Helsingfors, Finland) and G. Kvist. *Acta Med. Scand.* 188(1-2):75-80, 1970.

The results of pancreatic scanning after i.v. injection of ^{75}Se-selenomethionine were compared with clinical, surgical, and autopsy findings in 122 patients suspected of having pancreatic disease. Only 3 of 69 patients with a normal scan had pancreatic disease (insuloma, metastases from a bronchial carcinoma, and chronic pancreatitis, resp.). No clinical or surgical evidence of pancreatic disease was found, however, in 28 of the 53 patients with abnormal liver scans. The frequency of false positive scans was significantly higher among patients with liver and/or biliary disease than among a group of 39 controls with nonmalignant diseases of organs other than the pancreas. The frequency of incorrect diagnoses approached significance in patients with gastrointestinal disease, diabetes, and cancer. A correct diagnosis was established in only 75% of the 122 cases with pancreatic scanning. On the basis of these results it is concluded that the most important use of pancreatic scanning is in ruling out pancreatic disease with a high degree of confidence when a normal scan is obtained.

270 DIAGNOSIS AND ASSESSMENT OF BLEEDING TENDENCY IN CHRONIC LIVER FAILURE USING THREE SIMPLE COAGULATION TESTS. (E.) Mannucci, P. M. (U. Milan Dept. Med. Pathol., Italy). *Scand. J. Haematol.* 7(5):364-367, 1970.

Mean values of the prothrombin time (PT), prothrombin and proconvertin time (PPT), and kaolin-activated partial thromboplastin time (APTT) were significantly lower in 65 patients with chronic liver failure than in 45 controls. Reduction in the PPT was the most marked. Of these patients, 51 had abnormal PPT values, 41 had abnormal PT values, and 39 had abnormal APTT values. All 3 coagulation tests were positively correlated with serum albumin values but not with serum cholinesterase, γ-globulin, or BSP retention. Blood transfusions had to be given to 14 of these 65 patients. All 14 bleeders had abnormal PPT values, but both PT and APTT values were normal in 2 of these patients. Thus, the PPT appears to be the most reliable criterion for predicting the likelihood of bleeding in chronic liver failure although this test has a narrower spectrum of sensitivity to variations in blood clotting factors (prothrombin and factors VII and X) than the other 2 coagulation tests.

271 THE REDUNDANCY OF LIVER TESTS IN THE DIAGNOSIS OF CIRRHOSIS ESTIMATED BY MULTIVARIATE STATISTICS. (E.) Ramsøe, K. (Natl. Hosp., Copenhagen, Denmark), N. Tygstrup and P. Winkel. *Scand. J. Clin. Lab. Invest.* 26(4): 307-312, 1970.

Multivariate discriminant analysis was applied to 9 laboratory tests (BSP transport maximum and storage capacity, galactose elimination capacity, serum bilirubin, alkaline phosphatase, alanine transaminase, prothrombin, serum albumin and gamma-globulin), performed on 17 patients (10 men and 7 women, aged 40-70 yr) with cirrhosis and 19 controls. The BSP transport maximum was the most effective test for discriminating between the 2 groups, but it was significantly less effective than discrimination based on all tests. The discriminative effectiveness obtained by combining all 9 tests, however, was not significantly greater than that resulting from the 2 tests with the highest ranking: BSP transport maximum and serum gamma-globulin. Since results of discriminant analysis are greatly dependent on the size and selection of subjects, more tests which contribute significantly to discrimination may be found with larger groups of subjects.

272 PERCUTANEOUS MEASUREMENT OF PRESSURE IN THE LIVER IN THE DIAGNOSIS OF PORTAL HYPERTENSION. (Ger.) Paumgartner, G. (Univ. 2nd Med. Clin., Vienna, Austria), A. Wolf, H. Brunner, M. Niederberger and G. Grabner. *Z. Gastroenterol.* 8(9):564-569, 1970.

In 7 patients with mild to moderate fatty liver and in 10 with cirrhosis, comparisons were made of hepatic venous pressure determined by blind liver puncture and measurement of pressure with a transducer and by hepatic vein catheterization and measurement of the occlusive pressure. In general, good correlations were obtained between the results from these 2 methods. A liver puncture could not be performed in 1 patient with ascites; in another, pressure changes related to respiration made it impossible to evaluate the pressure curve. No patients complained of pain or had complications with the transhepatic method, but intrahepatic post-sinusoidal blocks could not be distinguished from extrahepatic ones with this method.

273 LIVER BIOPSY WITH A NEEDLE OF 0.7 MM OUTER DIAMETER. SAFETY AND QUANTITATIVE YIELD. (E.) Lundquist, A. (Univ. Hosp., Lund, Sweden). *Acta Med. Scand.* 188(6):471-474, 1970.

Only 1 complication occurred in 2611 liver biopsies performed on 2305 patients with a 22-gauge needle (0.7 mm outer diameter). A 61-yr-old woman with no history of bleeding developed an intrahepatic hematoma which had to be removed surgically. Abdominal pain lasting 1-2 days developed in 14 patients, 9 of whom had biliary obstruction. Repeat biopsies had to be performed in 15 patients without biliary stasis, because bile was found in biopsied material. Sufficient tissue for cytological diagnosis was obtained in 2580 biopsies (99% of the series).

274 A FLUORIMETRIC AND ENZYMATIC METHOD FOR THE ESTIMATION OF SERUM TOTAL BILE ACIDS. (E.) Murphy, G. M. (Roy. Free Hosp., London), B. H. Billing and D. N. Baron. *J. Clin. Pathol.* 23(7):594-598, 1970.

A modified technique is described by which bile acids in the blood are determined by their reaction with 3α-hydroxysteroid dehydrogenase and fluorimetric measurement of NADPH. Because of the high sensitivity of this method, bile acids can be determined in 3 ml blood samples from normal volunteers. Samples from patients with obstructive jaundice can be as small as 1 ml, thus minimizing interference due to bilirubin. Normal values for total serum bile acids were 0-4.7 μM/liter in males and 1.0-8.2 μM/liter in females; these values are comparable to others reported in the literature. The results obtained were precise, reproducible, and specific.

275 FINE-NEEDLE ASPIRATION BIOPSY FOR CYTODIAGNOSIS OF MALIGNANT TUMOUR IN THE LIVER. (E.) Lundquist, A. (Univ. Hosp., Lund, Sweden). *Acta Med. Scand.* 188(6):465-470, 1970.

Liver cancer was diagnosed by fine-needle aspiration biopsy in 39 of 57 patients in whom the presence of cancer was later confirmed histologically. No false positive results were obtained with the fine-needle aspiration method, but malignancy was suspected in 2 patients with cirrhosis. Malignant hepatomas were identified in 5 of 10 cases, but metastatic tumors were identified in only 2 cases (carcinoid tumors and malignant melanoma). About the same percentage of liver tumors were detected with fine-needle biopsies as with scintigraphy and angiography. None of the patients developed complications. These results indicate that cytological diagnosis of liver cancer with fine-needle aspiration biopsy is a safe and reliable method.

276 FURTHER STUDIES ON THE PERFUSION METHOD FOR MEASURING INTESTINAL ABSORPTION IN MAN: THE EFFECTS OF A PROXIMAL OCCLUSIVE BALLOON AND A MIXING SEGMENT. (E.) Sladen, G. E. (St. Bartholomew's Hosp., London, England) and A. M. Dawson. *Gut* 11(11):947-954, 1970.

An evaluation was made of the reliability and accuracy of a 2-lumen perfusion method, which employs an occlusive balloon positioned distal to the duodenojejunal flexure, for measuring intestinal absorption in 9 normal male volunteers, aged 21-33 yr. The perfusion solution consisted of glucose (56 mM), NaCl (120 mM), and polyethylene glycol (PEG; 2.5 g/liter) as a nonabsorbable marker. The infused solution and distal samples were analyzed for PEG by Hyden's method, for glucose by the glucose oxidase method, for sodium by flame photometry, and for chloride by coulometric titration. Luminal occlusion significantly reduced the variability of individual glucose and water absorption rates and reduced the variability of triplicate marker concentrations determined on the same individual. Luminal occlusion had no effect on the mean absorption rates of glucose, water, sodium, and chloride. This suggests that the presence of a balloon, either inflated or deflated, does not interfere with or affect segmental absorption rates. Although the results obtained with 2- and 3-lumen methods cannot be compared statistically, the findings suggest that variations both between and within individuals is at least as great, if not greater, with the 3-lumen method than with the 2-lumen method, even in the absence of luminal occlusion.

277 METHODS, ERRORS, AND HAZARDS IN ESOPHAGOSCOPY. (Ger.) Vogt-Moykopf, I. (Univ. Surg. Clin., Heidelberg, Germany), B. Hasper and D. Zeidler. *Mat. Med. Nordmark* 22(9-10):479-492, 1970.

278 MODERN DEVELOPMENTS IN ESOPHAGOSCOPY. (Ger.) Wodak, E. (Sophie Hosp., Vienna, Austria). *Fortschr. Endosk.* 2:151-154, 1970.

279 INTERPRETATION OF THE ESOPHAGUS IN ESOPHAGEAL RADIOGRAPHY. (Dut.) Van Grootenbril, R. (St. Elisabeth Hosp., Antwerp, Belgium). *Tijdschr. Gastroenterol.* 13(3):209-226, 1970.

280 IS ESOPHAGOSCOPY A GASTROENTEROLOGICAL PROCEDURE? (Ger.) Miller, G. (Zuchwilerstr. 43/6, Solothurn, Switzerland). *Schweiz. Med. Wochenschr.* 100(42):1759-1761, 1970.

281 THE CIRCULATION IN ESOPHAGOSCOPY. ESOPHAGO-CARDIAL REFLEX. (Ger.) Bachmann, K. (Univ. Med. Clin., Erlangen/Nuremberg, Germany), R. Ottenjann, N. Graf and O. Stadelmann. *Fortschr. Endosk.* 2:155-163, 1970.

282 GASTROSCOPY WITH THE FIBROSCOPE. REPORT OF 100 CASES. (Sp.) Palazzo, F. H. and A. Babot. *Sem. Med. (B. Aires)* 137(8): 264-270, 1970.

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285 GASTROSCOPY AND GASTRIC COLOUR PHOTOGRAPHY IN THE DIAGNOSIS OF GASTRIC DISEASES. (E.) Fung, W. P. (U. Singapore Dept. Clin. Med.). *Singapore Med. J.* 11(2):103-109, 1970.

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GASTROINTESTINAL DISEASES

ESOPHAGUS

360 BOERHAAVE'S SYNDROME: A REVIEW OF SIX CASES OF SPONTANEOUS RUPTURE OF THE ESOPHAGUS SECONDARY TO VOMITING. (E.) Bobo, W. O. (U. Mississippi Med. Ctr., Jackson), W. A. Billups and J. D. Hardy. *Ann. Surg.* 172(6): 1034-1038, 1970.

Spontaneous rupture of the esophagus occurred in 6 men, aged 50-65 yr, after vomiting. Of these patients, 1 was an alcoholic, 1 had a bleeding duodenal ulcer, 1 had chronic indigestion, and 1 was a moderately heavy drinker. Two patients died before surgery could be performed and 1 survived without it. None of the 4 who survived were hypotensive at admission although 3 were in respiratory distress and had tachycardia. The 3 operated patients had esophageal lacerations 2.5-3 cm long located just above the hiatus of the diaphragm and 2 had ruptures of the mediastinal pleura. After closure of the lacerations with 2 layers of interrupted silk and inversion of the mucosal layer, the mediastinal pleura was left open for drainage, and drainage tubes were placed in the area of the mediastinal rent. All 3 patients developed atelectasis, retained secretion, and pneumonitis and 2 developed empyema. Antibiotic therapy was effective in all 3 cases. One patient developed acute hepatic failure which progressed to coma, cardiac arrhythmia, and congestive heart failure but he eventually recovered.

361 CERTAIN MORTALITY PATTERNS OF ESOPHAGEAL CANCER IN THE UNITED STATES, 1930-1967. (E.) Schoenberg, B. S., J. C. Bailar, III and J. F. Fraumeni, Jr. (NCI, Bethesda, Md.). *J. Natl. Cancer Inst.* 46(1):63-73, 1971.

Mortality patterns for esophageal cancer in the U.S. are reported and correlations between the distribution of this disease and environmental influences suspected in its etiology are established. During the period 1930-1967, the nonwhite population (all ages, all geographic areas) exhibited a rapid and steady increase in mortality, while mortality in the white population remained relatively stable. Consistently higher death rates, especially among nonwhites, were observed in the Northeast than in other geographic areas of the country. Negro males and females and Chinese and Japanese males contributed to the excess in nonwhite mortality between 1950 and 1966. Significant correlations between mortality and the percentage of population living in urban areas, per capita cigarette sales, and per capita alcohol sales were observed. However, when partial correlation coefficients were calculated, esophageal cancer correlated significantly with urbanization, suggesting that a large part of the correlation between esophageal cancer and cigarette or alcohol consumption is due to higher sales in urban areas. Geographic variations in esophageal cancer in the U.S. can probably be attributed to some factor other than the smoking or alcohol consumption which is prevalent in the urban environment. It appears that Negroes have been increasingly exposed, and are more susceptible, to these carcinogenic influences.

362 CARCINOMA OF THE OESOPHAGUS WITH TYLOSIS. (E.) Harper, P. S. (U. Liverpool Nuffield Unit Med. Genet., England), R. M. J. Harper and A. W. Howel-Evans. *Q. J. Med.* 39(155):317-333, 1970.

A 12-yr follow-up was made of a family in which an association of esophageal carcinoma and tylosis (keratosis of the palms and soles) had been previously established, and a detailed study was made of a large branch of the family that had not previously been traced. Two female members of the family, aged 33 and 45 yr, had developed tylosis since their last examination, and 6 of the 14 family members who had died had esophageal cancer. All of these 6 subjects (4 men and 2 women, aged 30-72 yr at death) also had tylosis. No chromosome abnormalities were found in any of the 14 tylotic or 10 nontylotic family members studied. Linkage studies provide only minimal support for the hypothesis that the tylosis allele is on the same chromosome as the MNS blood-group system. Pedigrees are presented for 2 new and unrelated families with tylosis in each of which 1 member has developed esophageal cancer. In both families squamous cell carcinoma of the esophagus had been diagnosed and successfully treated in women, aged 39 and 44 yr, resp. In these 2 families the association between esophageal cancer and tylosis appears to be fortuitous.

363 ABSORPTION STUDIES AFTER EXCISIONAL SURGERY OF ESOPHAGEAL AND HIGH GASTRIC CARCINOMA. (E.) Inberg, M. V. (U. Turku Dept. Surg., Finland), T. Markkanen, T. M. Scheinin and J. Harri. *Acta Chir. Scand.* 136(6):509-516, 1970.

Follow-ups were made on 20 patients (14 men and 6 women, aged 40-76 yr) who had undergone esophageal resection (9 cases), proximal gastrectomy (5 cases), or total gastrectomy (6 cases) for removal of esophageal or high gastric carcinomas 2-8.5 yr before. Survivors with benign anastomotic stenosis were excluded because of their disturbed nutritional state. Mild anemia was diagnosed in 6 cases and reduced serum vitamin B_{12} values were found in 1 esophagectomized patient, in 2 partially gastrectomized patients, and in 5 totally gastrectomized patients. Results of the Schilling test were abnormal in 2 esophagectomized patients and in all gastrectomized patients. Iron absorption and bone marrow findings were normal in most cases, but 1 patient did have megaloblastic anemia after undergoing esophageal resection. Total fecal fat excretion was abnormally high in most gastrectomized patients and in 5 of the 9 who had undergone esophagectomy. Vitamin A absorption was abnormal in 4 esophagectomized patients, 2 partially gastrectomized patients, and 2 totally gastrectomized patients. Serum protein and natural folate absorption values were abnormal in 1 case each. RBC transketolase activities were normal in all but 3 patients, 1 of whom had definite neurological symptoms in the lower extremities, reduced folate and xylose absorption, and high fecal fat excretion after esophagectomy. Serum calcium levels were slightly decreased in 3 patients after esophagectomy and in 3 after partial gastrectomy. Serum phosphorus levels were elevated in 3 esophagectomized patients and in 1 partially gastrectomized patient. On the basis of these results, iron and vitamin B_{12} substitution are recommended after esophageal and proximal gastric resection.

364 ISOLATED HEAD AND NECK SYMPTOMS DUE TO HIATUS HERNIA. (E.) Hallewell, J. D. (Malcolm Grow USAF Med. Ctr., Washington, D. C.) and T. B. Cole. *Arch. Otolaryngol.* 92(5):499-501, 1970.

In 21 of 22 patients (11 men and 11 women, aged 34-61 yr) with hiatus hernia and reflux esophagitis, symptoms included foreign-body sensation in the throat, hoarseness, neck pain, and otalgia. The remaining patient had an intractable cough without any other symptoms. In 17 cases the symptoms were definitely more pronounced on arising in the morning. None had classical symptoms of hiatus hernia. Complete relief of symptoms was obtained in 18 cases and improvement in 3 with antacid therapy and elevation of the head in bed. The remaining patient, a 55-yr-old woman with an intractable nonproductive cough, responded poorly to conservative therapy and underwent hiatus hernioplasty for complete relief of the cough. These patients' symptoms are attributed to vagus nerve irritation.

365 ASSESSMENT OF DISTAL ESOPHAGEAL FUNCTION IN PATIENTS WITH HIATAL HERNIA AND/OR GASTROESOPHAGEAL REFLUX. (E.) Skinner, D. B. (Johns Hopkins Hosp., Baltimore, Md.) and D. J. Booth. *Ann. Surg.* 172(4):627-637, 1970.

Distal esophageal function was evaluated in 306 patients with hiatus hernia and/or gastroesophageal reflux, in 45 patients only after surgical treatment of upper gastrointestinal disorders, and in 91 normal subjects by manometry, acid perfusion, the pH reflux test, and acid clearance. In all cases in which gastroesophageal reflux was visualized radiographically the results of the pH reflux test were abnormal, but abnormal test results were obtained in a number of patients with no radiographic evidence of reflux. This confirms that radiography is not a very sensitive method for diagnosing gastroesophageal reflux. Manometric measurements revealed that the mean length of the high pressure zone at the gastroesophageal junction was significantly greater in patients with hiatus hernia than in normal controls, but it is probably better to diagnose hiatus hernia radiographically. Results of the acid perfusion test were not correlated with the presence of hiatus hernia but were significantly correlated with the patient's symptoms, the pH reflux test, and the acid clearing test. The main value of this test is to help in determining whether atypical symptoms are of esophageal origin or not. Results of the acid clearing test were positive correlated with the presence of hiatus hernia, the patient's symptoms, the pH reflux test, and the acid perfusion test and had a correlation of borderline significance with esophagitis. The results of these tests on 102 operated patients suggest that vagotomy and gastric procedures should not be performed in patients with gastroesophageal reflux unless active peptic ulcers are also present.

366 RESPONSE OF THE GULLET TO GASTRIC REFLUX IN PATIENTS WITH HIATUS HERNIA AND OESOPHAGITIS. (E.) Woodward, D. A. K. (Walsgrave Hosp., Coventry, England). *Thorax* 25(4):459-464, 1970.

Comparisons were made for 4 variables (acid reflux in the esophagus, peristaltic clearance, esophagitis, symptoms evident in the patient) in 33 patients with sliding hiatus hernia, excluding any with evidence of esophageal stricture. Abnormal motility was evident in those who had longer exposure to pH values less than 5 or 4 in the esophagus, but this association is not considered significant. Severity of reflux did not correlate with visual esophagitis, and severity of symptoms, found only in patients with esophageal pH levels below 4, did not correlate with degree of acid reflux. The duration of reflux was equal for those with abnormal and normal motility; somewhat slower clearing of acid was seen in those with abnormal motility and a 15-45 min. reflux period, but differences from those with normal motility were not significant. However, 11 of 12 patients with abnormal motility, compared to only 1 of 15 with normal motility, had a low pH for more than 45 min.; this difference is considered significant. Also, marked esophagitis was evident in 5 patients with abnormal motor function, whereas little or no esophagitis was seen in all patients with normal motility and in 6 with abnormal motility. This feature leads to the conclusion that abnormal motility can lead to esophagitis, but the reverse is not necessarily true.

367 OESOPHAGEAL REFLUX AND GASTRIC SECRETION. (E.) Ward, A. S. (Queen Elizabeth Hosp., Birmingham, England). *Gut* 11(9):738-742, 1970.

Perfusion of the lower esophagus with 0.1 N HCl markedly increased gastric acid secretion (but not gastric pH) in all but one of 20 patients with hiatus hernia and in all 20 controls. The response was immediate and lasted for about 30 min. After hiatal repair, the response to perfusion was reduced, particularly in those with esophagitis. The results suggest that control of acid reflux, and the subsequent increased sensitivity of the esophageal mucosa to acid, decreases the gastric response to esophageal acid perfusion.

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374 MEGAESOPHAGUS DISCLOSED BY SEVERE HEMATEMESIS. (Fr.) Gaillard, J. (Purpan Hosp., Toulouse, France), H. Eschapasse, E. Henry and J. Cerene. *Rev. Med. Toulouse* 6(7): 525-528, 1970.

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379 AORTA PERFORATION BY A FOREIGN BODY IN THE ESOPHAGUS. (Rus.) Gapanavichius, B. M. *Vestn. Otorinolaringol.* 32(5):118, 1970.

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381 ESOPHAGEAL STENOSIS CAUSED BY REFLUX ESOPHAGITIS. SURGICAL PROCEDURE IN A GASTRECTOMIZED PATIENT. (Sp.) Bonadero, R. A. (1st Surg. Clin., Cordoba, Argentina), E. O. Figueroa and C. Amiano. *An. Paul. Med. Chir.* 97(4):255-258, 1970.

382 SIMPLIFIED MANAGEMENT OF REFLUX ESOPHAGITIS WITH STRICTURE. (E.) Hill, L. D. (Virginia Mason Med. Ctr., Seattle, Wash.), M. Gelfand and D. Bauermeister. *Ann. Surg.* 172(4):638-651, 1970.

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See also numbers: 255, 277, 278, 279, 280, 281

389 CARCINOMA OF THE STOMACH. (E.) Goldsmith, H. S. (Jefferson Med. Coll., Philadelphia, Pa.) and B. C. Ghosh. *Am. J. Surg.* 120(3):317-319, 1970.

Only 21 of 270 patients (7.7%) treated for stomach cancer from 1960 through 1964 survived for 5 yr or more. The main reason for this low survival rate was the large number of patients (115 or 42.9%) who had widespread metastases at surgery. Of those who survived for 5 yr, 16 had tumors limited to the stomach and 5 had involvement of the regional lymph nodes. Although 17 of 35 patients operated for recurrences died in less than 6 months, 3 survived for 5 yr. It is suggested that survival rates for stomach cancer might be increased by screening high-risk individuals, e.g. those with pernicious anemia, achlorhydria, stomach ulcer, and anemia of unknown etiology.

390 HISTOCHEMICAL STUDIES ON MUCOSUBSTANCE IN HUMAN GASTRIC CARCINOMA. (E.) Sugimoto, A. (Hiroshima U. Sch. Dent., Japan) and K. Kirimoto. *Acta Histochem. Cytochem.* 3(3): 81-104, 1970.

Histochemical studies were made of mucus in 200 specimens from gastric carcinomas, 50 specimens of noncancerous stomach tissue, and 20 specimens of duodenal and rectal tissue. Two histologically distinct types of mucus were found in noncancerous stomach tissue: mucus characteristic of the stomach which stained with periodic acid-Schiff reagent but not with Alcian blue and the goblet cell type which gave positive reactions with both of these stains. There was an unusually high percentage of gastric carcinoma specimens in which goblet-type mucus was found. Goblet-type mucus is specific for goblet cells in areas of intestinal metaplasia. This type of mucus was found in 157 of the 200 specimens from gastric carcinomas (78.5%). Goblet-type mucus was found in 90 of 114 tubular adenocarcinomas, in 13 of 20 papillary adenocarcinomas, in all of 19 mucocellular carcinomas, in all of 13 muconodular carcinomas, in 2 of 3 adenoacanthocarcinomas, in 7 of 12 medullary carcinomas, in 13 of 16 scirrhus carcinomas, and in 0 of 3 epidermoid carcinomas. There was no difference between early and advanced gastric carcinomas in the percentage of specimens with goblet-type mucus. These findings suggest that the goblet-type of mucus in gastric carcinomas is closely related to the goblet-type of mucus in intestinal metaplasia.

391 GASTRIC LEIOMYOBLASTOMA. (E.) Bose, B. (Dreadnought Seamen's Hosp., London) and J. Candy. *Gut* 11(10):875-880, 1970.

Case reports are presented for 2 patients with gastric leiomyoblastomas, one with evidence of metastases. A 53-yr-old man, operated on for symptoms typical of a duodenal ulcer, had a leiomyoblastoma in the pyloric region of the stomach. Symptoms recurring after removal of the tumor were caused by a duodenal ulcer which was treated by vagotomy and pyloroplasty. No evidence of tumor recurrence was found. A 75-yr-old man with anemia, edema of the ankles, and hepatomegaly had a large leiomyoblastoma protruding from the posterior wall of the pyloric antrum into the transverse mesocolon with multiple liver metastases. Both patients remain well 7 and 3.5 yr after surgery, resp.

392 NOTES ON ALCOHOL METABOLISM IN GASTRECTOMIZED SUBJECTS. (Ger.) Kürzinger, R. (People's Police Hosp., Berlin, Germany). *Deutsch. Gesundh.* 25(43):2022-2027, 1970.

Blood alcohol levels were determined in 73 fasting subjects (who had undergone gastrectomy 4-19 yr previous to the study) 210-390 min after ingestion of 0.75 g/kg of alcohol as 80 proof, carbohydrate-free vodka. Although these subjects absorbed alcohol more rapidly than controls, the rates at which blood alcohol levels decreased were normal in all cases, even in 5 with pathological BSP tests and 4 with abnormal SGOT, SGPT, and serum LDH activities. No correlations were found between constitutional type or body weight and the rate of alcohol metabolism. Liver biopsies revealed that 14 gastrectomized subjects had fatty liver and none had cirrhosis; the incidence of fatty liver is about the same as in the general population.

393 THE EFFECT OF BUFFERED AND UNBUFFERED ASPIRIN ON GASTRIC pH MEASURED BY A pH-SENSITIVE TELEMETERING CAPSULE. (E.) Russell, R. I. (Univ. Dept. Med., Glasgow, Scotland) and A. Goldberg. *Scand. J. Gastroenterol.* 5(8):675-679, 1970.

A pH-sensitive radiotelemetering capsule was used to measure gastric acidity in 23 volunteers before and after ingestion of 600 mg of pure acetylsalicylic acid, aspirin buffered with calcium carbonate ('soluble aspirin'), or aspirin buffered with sodium bicarbonate ('Catalgix forte'). All of these subjects complained of dysphagia but had normal fasting gastric acidity values and no radiological evidence of esophageal or gastric abnormalities; 3 had a history of gastrointestinal bleeding thought to be caused by aspirin-induced erosions. While unbuffered aspirin did not cause any change in the gastric pH, both buffered aspirins reduced the acidity significantly. This effect was more pronounced and lasted longer with 'Catalgix forte' than with 'soluble aspirin.' In 21 of the 73 tests a later increase in acidity occurred after the pH had returned to its baseline value. This effect was significantly less pronounced and of significantly shorter duration with 'Catalgix forte' than with the other preparations. A late increase in acidity was noted in only 1 of the patients with a history of aspirin-induced gastric erosions. In 15 patients with achlorhydria all 3 aspirin preparations caused an increase in the gastric pH. This effect was most pronounced with unbuffered aspirin and least pronounced with 'Catalgix forte.' No late effect on gastric acidity was noted in these patients. From these findings it is concluded that aspirin probably does not cause mucosal erosions by increasing gastric acidity except in patients with achlorhydria.

394 HEMORRHAGIC GASTRITIS. IMPORTANCE OF ASSOCIATED CHRONIC GASTRITIS. (E.) Winawer, S. J. (Mem. Hosp. Cancer Allied Dis., New York, N. Y.), J. Bejar, R. S. McCray and N. Zamcheck. *Arch. Intern. Med.* 127(1):129-131, 1971.

Peroral gastric biopsies from 25 patients hospitalized with upper gastrointestinal hemorrhages showed that 10 had only superficial gastritis while 15 had atrophic gastritis. Of 15 patients who ingested more than 1 pint of whiskey for several weeks, 8 had atrophic gastritis. This incidence of atrophic gastritis is not unusual for a hospital population. However, 7 of the 8 patients who ingested more than 2 g/day of aspirin for 3 months or more had atrophic gastritis. This unusually high incidence of atrophic gastritis suggests that even mild to moderate atrophic gastritis renders the gastric mucosa susceptible to bleeding from aspirin.

395 MASSIVE GASTROINTESTINAL HEMORRHAGE. (E.) Byrne, J. J. (Boston City Hosp., Mass.), V. A. Guardione and L. F. Williams. *Am. J. Surg.* 120(3):312-316, 1970.

Of 172 surgically treated patients hospitalized with massive gastrointestinal hemorrhages from 1960 through 1969, 44 (25%) died. Most of these patients were elderly and 27% were women. The cause of bleeding was diagnosed as peptic ulcer (119 cases), gastritis (37 cases), marginal ulcer (8 cases), and 1 case each of gastric polyp, Mallory-Weiss syndrome, duodenitis, peptic esophagitis, duodenal diverticulitis, aortoduodenal fistula, and jejunal polyp; in 1 case the cause remains unknown. Excisional therapy was employed for 90 ulcer patients and resulted in 17 deaths; 12 of these 17 had cirrhosis. Pyloroplasty with vagotomy was used in 21 patients, 4 of whom died; none of these patients had cirrhosis. Complications included duodenal blowouts in 7 cases, 5 of which were fatal; postoperative gastrointestinal bleeding in 20 patients, 10 of whom died; and pancreatitis in 6 patients. Associated diseases included heart disease in 66 cases (25 deaths), pulmonary disease in 62 patients (21 deaths), genitourinary disease in 29 patients (11 deaths), and cirrhosis in 56 patients (21 deaths). Among cirrhotics the mortality increased with increasing BSP retention. These results indicate that gastrointestinal hemorrhages caused by peptic ulcers, particularly duodenal ulcers, and hemorrhagic gastritis are best controlled by excisional therapy.

396 GASTRIC SARCOMAS. (Rev.) (E.) Remine, W. H. (Mayo Clin., Rochester, Minn.). *Am. J. Surg.* 120(3):320-323, 1970.

397 SARCOMAS OF THE STOMACH. (E.) Cathcart, R. S., III (Med. U. South Carolina, Charleston), J. P. Sutton and H. B. Gregorie, Jr. *Ann. Surg.* 173(3):398-402, 1971.

398 CASE REPORT OF GASTRIC LIPOMA. (Jap.) Fujimura, K. (Nihon U. Med. School, Tokyo). *Stomach Intest. (Tokyo)* 5(10):1265-1270, 1970.

399 RAPIDLY GROWING GASTRIC FIBROMA. (Sp.) Rull Segura, S. (U. Navarra Dept. Dig. Clin., Spain) and J. M. Diaz Emparanza. *Rev. Esp. Enferm. Apar. Dig.* 32(3):295-300, 1970.

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401 MALIGNANT GASTRIC MELANOMA: PRESENTATION OF A NEW CASE AND REVIEW OF THE LITERATURE. (Sp.) Voltas, J. (U. Navarra Sch. Med., Spain), F. Hernandez, J. F. Onaindia and G. Zornoza. *Rev. Esp. Enferm. Apar. Dig.* 32(4):431-440, 1970.

402 THE LEIOMYOBLASTOMA OF THE STOMACH. (E.) Tanghe, W. (St. Rafael Acad. Hosp., Louvain, Belgium), J. Braeckman, V. Desmet and D. Noyez. *Tijdschr. Gastroenterol.* 13(3):244-260, 1970.

403 CASE OF GASTRIC CARCINOMA. (Jap.) Yao, T. (Kyushu U. Sch. Med., Fukuoka, Japan). *Stomach Intest. (Tokyo)* 5(10):1247-1254, 1970.

404 LATE GASTRIC CARCINOMA DEVELOPING AFTER SURGERY FOR BENIGN CONDITIONS. ENDOSCOPIC AND HISTOLOGIC STUDIES OF THE

ANASTOMOSIS AND DIAGNOSTIC PROBLEMS. (E.) Kobayashi, S. (U. Chicago Pritzker Sch. Med., Ill.), J. C. Prolla and J. B. Kirsner. *Am. J. Dig. Dis.* 15(10):905-912, 1970.

405 CASE OF A BENIGN GASTRIC LESION RESEMBLING TYPE IIC EARLY GASTRIC CANCER. (Jap.) Takamura, Y. (Yokohama City U. Sch. Med., Japan). *Stomach Intest. (Tokyo)* 5(10):1261-1264, 1970.

406 CLINICAL FEATURES AND SURVIVAL IN SIMPLE EXPLORATORY LAPAROTOMIES FOR STOMACH CANCER. (Sp.) García Barón, A. *Rev. Esp. Enferm. Apar. Dig.* 33(1):3-18, 1971.

407 T-N-M CLASSIFICATION FOR STOMACH CANCER. (E.) Kennedy, B. J. (U. Minnesota Sch. Med., Minneapolis). *Cancer* 26(5):971-983, 1970.

408 TRAUMATIC RUPTURE OF THE SPLEEN. UNUSUAL COURSE SIMULATING GASTRIC CANCER. (Sp.) Spector, C. H. (Metropol. Sanatorium, Buenos Aires, Argentina), J. A. Ferreira and M. Meeroff. *Sem. Med. (B. Aires)* 136(40):1460-1464, 1970.

409 ESOPHAGOSCOPIC REMOVAL OF AN UNUSUAL FOREIGN BODY IN THE STOMACH. (Ger.) Schmid, E. (1st Med. Clin., Lubeck, Germany) and G. Specht. *Z. Gastroenterol.* 8(6):362-364, 1970.

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413 PREPYLORIC ANTRAL STENOSIS. REPORT OF A CASE WITH MUSCULAR HYPERTROPHY AND MUCOSAL WEB. (E.) Willcoxon, R. L. (St. Francis Hosp., Wichita, Kans.) and G. J. Farha. *J. Kans. Med. Soc.* 71(9):353-354, 1970.

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415 A HUGE GASTRIC DIVERTICULUM. (E.) Seltzer, M. H. (U. Pennsylvania Hosp., Philadelphia) and A. W. Koch. *Am. J. Dig. Dis.* 16(2):167-170, 1971.

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420 MORPHOLOGICAL CHANGES OF THE STOMACH AND LARGE INTESTINAL MUCOSA IN CHRONIC GASTRITIS. (Rus.) Parfenov, A. I. *Sov. Med.* 33(10):34-39, 1970.

421 ULTRASTRUCTURE OF THE GASTRIC MUCOSA IN ATROPHIC GASTRITIS. (Sp.) Aleman-Gavotti, C. (Cent. U. Venezuela Dept. Pathol. Anat., Caracas), B. Bruni-Celli and J. Valencia-Parparcen. *G.E.N. (Caracas)* 25(2):123-130, 1970.

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424 RAPID ENDOSCOPIC CONTROL OF BLEEDING GASTRIC EROSIONS BY LASER RADIATION. (E.) Goodale, R. L. (U. Minnesota Health Sci. Ctr., Minneapolis), A. Okada and R. Gonzales. *Arch. Surg.* 101(2):211-214, 1970.

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426 TREATMENT OF STOMACH DISEASES WITH HEXOCYCLIUM METHYLSULFATE RETARD. (Ger.) Zurbonsen, K. (Geibelstr. 33, Hannover, Germany), C. Lohmann and G. Ecklebe. *Ther. Ggw.* 109(12):1774-1776, 1970.

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See also numbers: 256, 257, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 363, 381, 441, 474, 475, 483, 484, 523, 562, 577, 620, 861

PEPTIC ULCERS

432 THE EFFECT OF SOME ANTICHOLINERGIC AGENTS ON GASTROINTESTINAL HEMORRHAGES CAUSED BY PHENYLBUTAZONE. (Fr.) Duchêne-Marullaz, P. (CERM, Riom, France), M. Constantin and J. Talvard. *C. R. Soc. Biol. (Paris)* 163(2):324-327, 1970.

Atropine (1.5, 3, 5, 10, and 20 mg/kg), N-methylhyoscine methyl sulfate (0.5, 1.5, 3, and 6 mg/kg), and N-methylhyoscine bromide (20 and 50 mg/kg) were administered p.o. to Charles River CD1 rats with a single dose of phenylbutazone (200 mg/kg p.o.). The severity of hemorrhages produced by phenylbutazone was evaluated by determining fecal radioactivity after labeling RBC with ^{51}Cr. Hemorrhages produced by phenylbutazone were corrected by 10 and 20 mg/kg of atropine and by 6 mg/kg of N-methylhyoscine methyl sulfate; N-methylhyoscine bromide had no effect at the dosages used. Since these anticholinergic agents prevented bleeding produced by phenylbutazone, gastric acid and pepsin secretion must play an important role in the etiology of these hemorrhages. Anticholinergic agents may act by correcting local circulatory disorders.

433 THE GASTRIC MUCOSAL BARRIER: CLINICAL AND EXPERIMENTAL STUDIES IN CRITICALLY ILL AND NORMAL MAN, AND IN THE RABBIT. (E.) Skillman, J. J. (Harvard Med. Sch., Boston, Mass.), S. A. Gould, R. S. K. Chung and W. Silen. *Ann. Surg.* 172(4):564-584, 1970.

Study of the gastric mucosal barrier to the passage of H^+ in 26 critically ill and 22 normal men (and after hemorrhagic shock in the rabbit) showed that approximately half of the critically ill patients (12 of 26) had very high rates of back-diffusion. The rate of back-diffusion of H^+ cannot be predicted from standard tests of gastric secretory function (basal acid output and augmented histamine tests), but increased rates were frequently found among very sick patients hospitalized in intensive care units who had received steroids, and in whom hypotension, jaundice, renal failure, and a high mortality rate were common clinical features. Acute nonshocking rapid venous hemorrhage (15% of measured blood volume) in normal males was associated with true decrease in gastric acid secretion (72±6%). In man, gastric mucosal permeability to H+ is not increased by a hemorrhage of this magnitude. Hemorrhagic shock in rabbits damages the gastric mucosal barrier allowing increased gastric acid back-diffusion. Disruption of the barrier function of the stomach, especially in the presence of poor vascular perfusion, may be an important clue to the pathogenesis of acute stress ulcers in the human stomach.

434 HISTOLOGICAL CHANGES IN THE STOMACH WALL OF DOGS TREATED WITH PHENYLBUTAZONE. (Fr.) Barroy, J.-P. (Saint Pierre Hosp., Brussels, Belgium), G. Willems, S. Verbeustel and A. Gerard. *Acta Gastroenterol. Belg.* 33(7): 469-481, 1970.

Daily i.m. injections of 560 mg of phenylbutazone, given to 14 dogs for 4-24 days, produced ulcers analogous to those described in man. One or more peptic ulcers developed in 10 of these dogs: 8 in the gastric fundus, 4 in the antrum, and 3 in the duodenum. Vasodilation and generalized edema of the mucosa and submucosa developed as early as 4 days after treatment was instituted. Both deep and superficial ulcers were seen: superficial ulcers in areas which secreted large amounts of mucus and deep ulcers in areas where mucus secretion appeared normal. In contrast to other reports in the literature, phenylbutazone increased rather than decreased mucus secretion. Increased mucus secretion and connective tissue edema appear to be the principal cause of superficial ulcers while the cytotoxic effect and vasomotor disorders appear to result in deep ulcers. The histamine-stimulated gastric acid output in phenylbutazone-treated dogs did not differ significantly from control values.

435 ROLE OF THE LIVER IN THE PREVENTION OF INDOMETHACIN-INDUCED INTESTINAL ULCERS BY SPIRONOLACTONE. (E.) Selye, H. (U. Montreal Inst. Exp. Med. Surg., Quebec, Canada). *Acta Hepatosplenol. (Stuttg.)* 17(6):393-397, 1970.

Experiments performed on 120 female Holtzman rats showed that the ulcerogenic effect of indomethacin (0.5 of 1.0 mg/day s.c.) was enhanced by partial hepatectomy. However, development of perforating intestinal ulcers could be prevented by administration of 0.5 or 1.0 mg/day of spironolactone p.o. through a stomach tube, starting 4 days before administration of indomethacin. The protective effect of spironolactone was particularly evident in partially hepatectomized animals. These findings suggest that both indomethacin and spironolactone are detoxified in the liver since their effects are enhanced by partial hepatectomy. The prophylactic effect of spironolactone may involve nonspecific enzyme induction by liver microsomes.

436 INDOMETHACIN-INDUCED INTESTINAL LESIONS IN THE RAT. (E.) Brodie, D. A. (Merck Inst. Therap. Res., West Point, Pa.), P. G. Cook, B. J. Bauer and G. E. Dagle. *Toxicol. Appl. Pharmacol.* 17(3):615-624, 1970.

Large single or multiple doses of indomethacin (IM; 16 mg/kg s.c. or p.o.) produced perforations of the midportion of the small intestine in 100% of the male Holtzmann rats fed on day of administration. Starvation for 3 days before or 3 days after IM administration prevented induction of any lesions. The development of intestinal perforation depended upon the duration of food deprivation and amount of food consumed in the period before or after treatment. Gross examination of lesions revealed palpable nodules of the serosal surface and adhesions with adjavent intestinal loops. Lesions were sharply-dilineated, perforating ulcers with inflammation and edema. Prior ligation of the bile duct completely prevented induction of lesions by IM; but the incidence of perforations increased as time between initial drug administration and subsequent bile duct ligation increased. When Thiry loops were prepared to determine effects of IM in the plasma, but not in the intestinal contents, perforations were produced in all the anastamosed portions of intestine, but not in the isolated loops. No protection from IM-induced ulcers was obtained by administration of atropine sulfate, scopolamine methyl bromide, bretylium, cyproheptadine, pentobarbital, chlorpromazine, or aluminum hydroxide; a reduction from 100% to 30% was seen with cholestyramine (2 g/kg, p.o.). Large doses of aspirin (100-1600 mg/kg p.o.) to fed rats failed to produce ulcers, whereas a low incidence of perforating ulcers occurred with high doses of phenylbutazone (200 mg/kg p.o.).

437 EFFECTS OF EARLY EXPERIENCE AND DIFFERENTIAL HOUSING ON SUSCEPTIBILITY TO GASTRIC EROSIONS IN LESION-SUSCEPTIBLE RATS. (E.) Ader, R. (Strong Mem. Hosp., Rochester, N. Y.). *Psychosom. Med.* 32(6):569-580, 1970.

A population of rats susceptible to immobilization-induced gastric erosion was obtained by breeding males of an ulcer-susceptible strain to Charles River females. The offspring of these rats and Charles River controls were randomly assigned to groups which were handled daily from birth to 21 days or from 21-42 days or which remained undisturbed. Half of each group was than housed individually and half was housed in groups of 4-5 animals to a cage. At age 3 months emotional reactivity was evaluated by a reaction-to-handling test in which the incidence of startle responses, vocalization, and resistance to being picked up were recorded. Emotional reactivity was lower in group-housed than in individually-housed rats and was lower in the individually-housed, handled group than in nonhandled controls. Handling had no effect on emotional reactivity in the lesion-susceptible population. Plasma pepsinogen levels were significantly higher in unhandled lesion-susceptible rats than in unhandled controls. Housing had no effect on plasma pepsinogen levels, but handling after weaning increased them. Gastric erosions developed in 56.5% of the lesion-susceptible rats and in only 19.3% of the controls, and the number of lesions/animal was significantly higher among the lesion-susceptible population. Analysis of variance of the number of lesions/animal showed that susceptibility to erosions was determined by early experience and subsequent housing conditions of the animals. Handling had no effect on the development of gastric erosions in rats subsequently housed in groups; among individually-housed animals, handling prior to weaning reduced susceptibility to gastric erosions and handling after weaning increased susceptibility in both populations. It is concluded that early experiences can modify genetically-determined susceptibility to gastric erosions.

438 PREVENTION OF THE EXPERIMENTAL GASTRIC ULCER IN THE RAT BY SOME FOLK MEDICINAL PLANTS IN TAIWAN. (E.) Su, C.-Y. (Taipei Med. Coll., Taiwan), S.-Y. Hsu and Y.-T. Wang. *J. Formosan Med. Assoc.* 69(10):507-513, 1970.

Acute stress ulcers were produced in rats fasted for 24 hr by immobilizing them and immersing them in water at 25C for 3.5 and 7 hr. These ulcers were effectively prevented by p.o. administration every 2.5 hr of 15 g/kg or i.p. injections of 5 mg/kg of crude extracts from Glycyrrhiza uralensis, Typhonium divaricatum, Rhus semialata var. roxburghii, Alpinia speciosa, and Bischofia trifoliata. Ulcers produced by s.c. injection of 5 mg/kg of reserpine followed by 24 hr of fasting were prevented by i.p. injection of 5 mg/kg crude extracts from Glycyrrhiza uralensis, Alpinia speciosa, and Typhonium divaricatum. Raw papaya juice, which is used for the treatment of peptic ulcer on Taiwan, proved ineffective in these experiments.

439 THE EFFECT OF ADAPTATION ON THE SENSITIVITY OF RATS TO ULCERS PRODUCED BY IMMOBILIZATION. (Fr.) Martin, M. S. (Edouard Herriot Hosp., Lyon, France), F. Martin and R. Lambert. *C. R. Soc. Biol. (Paris)* 164(4):826-828, 1970.

Experiments performed on male and female Wistar rats showed that significantly fewer rats developed stomach ulcers when they were subjected to 4 sessions of immobilization, lasting 6 hr each, 3 days before they were immobilized for 24 hr. Large ulcers, measuring 3 mm or more in diameter, were also significantly less frequent among adapted animals.

440 EXPERIMENTAL GASTRIC ULCERS IN THE RAT: THE SEPARATE AND COMBINED EFFECTS OF VAGOTOMY AND BILE-DUCT IMPLANTATION INTO THE STOMACH. (E.) Kirk, R. M. (Hampstead Gen. Hosp., London). *Br. J. Surg.* 57(7):521-524, 1970.

In experiments performed on young male and female Sprague-Dawley rats, localized gastric erosions or ulcers were produced in 13 of 30 animals by implanting into the glandular part of the stomach the lower bile duct, which carries both bile and pancreatic juice. Implantation of the upper bile duct, which carries bile only, into the stomachs of 10 rats produced erosions or ulcers in 3 cases. This suggests that bile alone produces gastric ulcers and that pancreatic juice is not essential. No lesions were produced by vagotomy alone or by vagotomy and division of the left gastric vessels. When vagotomy was combined with implantation of the lower bile duct into the stomach, lesions developed in 3 of 10 cases. Since gastric lesions were not more frequent in vagotomized than in nonvagotomized rats, vagotomy apparently does not enhance the ulcerogenic effect of bile duct implantation into the stomach. In all animals who developed gastric erosions or ulcers, the lesion was located close to or opposite to the point where the bile duct was implanted. No lesions developed when the lower bile duct was implanted into the cecum.

441 PYLORIC REGURGITATION AND GASTRIC ULCER. (E.) Flint, F. J. (Northern Gen. Hosp., Sheffield, England) and P. Grech. *Gut* 11(9):735-737, 1970.

In a study of 56 persons including 12 normal controls, 21 patients with gastric ulcer (6 with pyloroduodenal deformity, 15 without), 16 patients with duodenal or pyloric ulcer, and 7 with chronic alcoholic gastritis, radiological examinations established that the pyloric regurgitation mechanism is competent in normal persons, whereas it is incompetent in most patients with ulcers and in all with chronic gastritis. In the patients with gastric ulcer, reflux was more pronounced in the absence of deformity, especially with the patients in an erect position. One of 8 normal persons showed reflux in an erect and supine position; all 6 gastric ulcer patients with pyloroduodenal deformity and 13 of 15 without deformity had pyloric reflux. Of the patients with duodenal ulcer and chronic gastritis, 14 of 16 and all 7, resp., showed pyloric reflux. The regurgitation mechanism was not as pronounced in duodenal ulcer as in gastric ulcer, and it was not influenced by position. These findings suggest that pyloric reflux is the cause of ulceration; bile salts tend to injure the mucosa, allowing acid to cause ulceration and erosion of the stomach lining.

442 FUNCTIONAL AND METABOLIC EFFECTS OF VAGOTOMY AND PYLOROPLASTY. (E.) Somayaji, B. N. (Meharry Med. Coll., Nashville, Tenn.). *Q. J. Med.* 39(155):441-460, 1970.

A prospective study was made of the effects of infradiaphragmatic bilateral total vagotomy and pyloroplasty in 19 Caucasian patients (12 men and 7 women, aged 29-63 yr) treated for duodenal ulcer (15), stomach ulcer (2), or both duodenal and stomach ulcers. No patients showed any evidence of lactose intolerance, either before or after surgery, and values for lactase, maltase and sucrase activities were comparable with those of normal individuals. The lactase activity in the proximal jejunum after vagotomy and pyloroplasty was significantly reduced, but the lactase activity in the distal jejunum was increased, explaining the normal absorption of lactose. After surgery 7 patients developed episodic diarrhea. Severe symptoms, present in 2 cases, were relieved by a diet containing no milk. This suggests that post-vagotomy diarrhea is probably due to a sensitivity to milk proteins, at least in some individuals. After surgery other disorders included elevated fecal fat excretion and increased plasma insulin and 15 and 30 min blood glucose levels following p.o. glucose. Before surgery serum globulin levels were significantly increased, suggesting an underlying autoimmune mechanism is involved in the pathogenesis of peptic ulcer. Serum folates were low in 6 patients 1 yr after surgery.

443 A PROSPECTIVE EVALUATION OF VAGOTOMY-PYLOROPLASTY AND VAGOTOMY-ANTRECTOMY FOR TREATMENT OF DUODENAL ULCER. (E.) Jordan, P. H., Jr. (VA Hosp., Houston, Tex.) and R. E. Condon. *Ann. Surg.* 172(4):547-563, 1970.

A controlled perspective study was made of 200 consecutive male patients requiring elective surgery for duodenal ulcers by randomly selecting vagotomy and pyloroplasty or vagotomy, antrectomy, and gastroduodenostomy prior to surgery. Because of potential technical difficulties in 10 cases this protocol was violated so that the operations performed included vagotomy and pyloroplasty in 94 cases; vagotomy and gastroenterostomy in 14; vagotomy, antrectomy, and gastroduodenostomy in 73; and vagotomy, antrectomy, and gastrojejunostomy in 19. For evaluation patients were divided into 2 groups: those who were subjected to vagotomy and drainage (108 cases) and those subjected to vagotomy and resection (92 cases). No significant differences were found between these 2 groups in mortality, early postoperative complications, or long-term gastrointestinal symptoms. Hollander's test, performed postoperatively on 177 patients, showed evidence of incomplete vagotomy in 50% of the patients subjected to vagotomy and drainage and in only 13% of the patients subjected to vagotomy and resection. Basal and augmented betazole gastric secretory tests were significantly reduced in both groups of patients, but reductions were greater after vagotomy and resection. In the vagotomy and drainage group, 8 patients were operated on for recurrent ulcers and 3 are under observation for suspected recurrent ulcers. No recurrences occurred in the vagotomy and resection group. Because of the high recurrence rate after vagotomy and drainage, vagotomy and antrectomy is the operation of choice for duodenal ulcers except for cases in which technical difficulties with the duodenum might be encountered.

444 THE EFFECT OF GRADED INSULIN DOSES ON INCOMPLETELY VAGOTOMIZED SUBJECTS. (E.) Isenberg, J. I. (VA Ctr., Los Angeles, Calif.), G. F. Stening, J. L. Pitcher and A. M. Brooks. *Gastroenterology* 59(5):698-700, 1970.

The dose-response curve for insulin stimulation of gastric acid secretion was essentially the same in normal subjects and in 5 healthy men, aged 35-55 yr, who had undergone vagotomy and pyloroplasty for treatment of duodenal ulcers 6 months to 5 yr before secretory tests were performed. Insulin was injected rapidly in doses of 0.025, 0.05, 0.1, 0.2, and 0.4 U/kg i.v., and secretory response to betazole (1.5 mg/kg s.c.) was also studied. Increases in gastric secretory volume, acid concentration, and acid output occurred within 45 min after histamine injection, placing the vagotomized patients in the "early" positive group. The maximum mean peak 15-min acid output occurred after injection of 0.4 U/kg, but this response was not significantly greater than the response to 0.2 U/kg. The mean peak 15-min acid outputs after insulin or betazole stimulation were significantly lower in the vagotomized patients than in normal controls and the mean peak 30-min acid output after betazole stimulation was significantly lower than in unoperated duodenal ulcer patients. These results suggest that the 5 vagotomized patients had incomplete vagotomy.

445 RECURRENT ULCERATION AFTER VAGOTOMY AND DRAINAGE WITH ELECTRICAL STIMULATION TEST, 1957-1969. (E.) Burge, H. (West London Hosp.), R. D. Stedeford and D. Hollanders. *Br. Med. J.* 2(5719):372-375, 1970.

Between 1957 and 1969, 700 patients with duodenal ulcers were subjected to selective vagotomy and simple drainage. To ensure complete section of the vagus nerve, the electrical stimulation test was used in all cases. Case reports are presented for 10 of these patients who were later hospitalized for recurrent ulcers. In 1 case the patient had gastric retention which resulted in the development of a gastrojejunal ulcer which healed spontaneously. In another case the patient developed a gastric ulcer due to gastric retention which was corrected by gastrojejunostomy. The electrical stimulation test, used during reoperation to complete vagotomy, confirmed that vagotomy had been incomplete in the remaining 8 patients. Insulin tests run several months after surgery were negative in 7 of these 8 patients.

446 POSTGASTRECTOMY SYNDROME. A CLINICAL STUDY BASED UPON 100 PATIENTS.

(E.) Rejman, F. (Helsinki U. Cent. Hosp., Finland). *Ann. Chir. Gynecol. Fenn.* 59(Suppl. 170):1-63, 1970.

Between 1966 and 1968 a follow-up study was made of metabolic, hematopoietic, and histological changes in 100 patients (75 men and 25 women) out of 255 who had undergone partial gastrectomy for gastric ulcer (40 cases) or duodenal ulcer (60 cases) between 1951 and 1955. None of these patients had any evidence of cancer and all had been subjected to Billroth II gastroenterostomy. About 20% of the patients reported weight loss, 59% had milk intolerance, 11% had a tendency toward loose stools or diarrhea, 58.8% had moderate to severe postprandial distress, and 6% had impaired vitamin A absorption. In general, no sex differences were noted in these symptoms. Fecal fat determinations, performed in 43 cases, showed that 25 patients had steatorrhea. Radiological examination of the stomach revealed that 4 patients had hiatus hernia and 1 had an abnormally large gastric stump. Hemoglobin values were below 12.5 g/100 ml in 9 women and were below 13.5 g/100 ml in 40 men. The mean corpuscular hemoglobin values, mean corpuscular hemoglobin concentrations, and RBC correlated fairly well with the hemoglobin values but serum iron levels did not. Fluctuations in vitamin B_{12} values were noted. Of 13 patients who had low values (less than 100 pg/ml), 4 had normal values 1 yr later although they had received no medication. The Schilling test showed impaired vitamin B_{12} absorption in 41 of 97 patients (42.3%). Histological examination of blind aspiration biopsies of the gastric mucosa taken from 42 of these patients revealed that 35 (83.6%) had severe changes which were present in only 7 of 21 age-matched controls (33.3%). These changes included superficial to severe gastritis, intestinal metaplasia, and mucosal atrophy. No correlation was found betwen these changes and abnormal serum vitamin B_{12} values or evidence of abnormal vitamin B_{12} absorption. The cortical index, determined on the femur, indicated that 7 patients had bone disease; only 4 of these patients had symptoms consistent with a diagnosis of osteomalacia or osteoporosis. None of these patients had abnormally low serum alkaline phosphatase activities which is regarded by some authorities as the most sensitive indicator of changes in skeletal metabolism. Abnormally low serum calcium levels were present in 6 of 59 cases (10.2%) and abnormally low serum phosphorus levels were found in 15 of 59 cases (25.4%).

447 FOUR-YEAR TO EIGHT-YEAR RESULTS OF VAGOTOMY AND SIMPLE DRAINAGE FOR BENIGN LESSER CURVE GASTRIC ULCER.

(E.) Burge, H. (West London Hosp.), A. M. Gill, C. MacLean and R. Stedeford. *Br. Med. J.* 2(5719):376-378, 1970.

Five-to 8-yr follow-ups were made on 62 of 72 patients who had undergone vagotomy and simple drainage for recurrent benign ulcers in the lesser curve of the stomach. In 59 cases the patients were asymptomatic and showed no radiological evidence of stomach ulcers. Gastric retention was responsible for recurrent gastric ulcers in the remaining 3 cases (1 man and 2 women, aged 56-72 yr). In 1 case the ulcer healed spontaneously. In the other 2 cases healing occurred after gastrojejunostomy performed to improve antral drainage. These findings confirm the hypothesis that benign ulcers in the lesser curve of the stomach are caused by transient or persistent gastric retention or by pyloric channel disease.

448 PRE- AND POSTOPERATIVE INSULIN TESTS IN PATIENTS WITH DUODENAL ULCER. COMPARISON WITH THE AUGMENTED HISTAMINE TEST.

(E.) Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 5(8):687-693, 1970.

In an attempt to identify patients who develop recurrent ulcers, an analysis was made of pre- and postsurgical values for basal and insulin- and histamine-stimulated gastric acid secretion in 58 men and 10 women subjected to truncal vagotomy and pyloroplasty and in 12 men subjected to truncal vagotomy and gastrojejunostomy for duodenal ulcers. Examinations made 3.5 yr after surgery showed that 5 of the men who had pyloroplasty and 1 of the men who had a gastrojejunostomy had developed persistent or recurrent ulcers. Incomplete vagotomy was verified in 4 of these 6 men by a second operation. Following surgery significant reductions were noted in basal and insulin- and histamine-stimulated gastric acid secretion in all patients, particularly in those subjected to gastrojejunostomy. Pyloroplasty and vagotomy caused less of a reduction in basal secretion in women than in men. In patients with recurrent ulcers both the basal volume and acid output were significantly higher postoperatively than in patients without recurrent ulcer despite a significant reduction in basal acid output after surgery. Insulin- and histamine-stimulated acid outputs were also significantly higher in these patients after surgery.

449 RESULTS OF PROLONGED INSULIN TESTS IN PATIENTS WITH DUODENAL ULCER. COMPARISON BETWEEN INSULIN- AND HISTAMINE-ACTIVATED GASTRIC ACID SECRETION.

(E.) Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 5(8):695-702, 1970.

Gastric acid secretion was measured before and after injection of insulin (0.4 IU/kg i.v.) in 7 patients (6 men and 1 woman, aged 24-63 yr) with duodenal ulcers. A comparison was made between the insulin test and the augmented histamine test in 87 patients (77 men and 10 women) with duodenal ulcers. Basal acid secretion varied greatly and was higher in men than in women. No correlation was found between bile contamination and the magnitude of basal or stimulated acid secretion. Initially, insulin depressed gastric acid secretion in most patients. This may be due to hypoglycemia-induced increases in blood catecholamines which inhibit gastric acid secretion by vasoconstriction; hypoglycemic vagal stimulation overcomes this effect after 30 min. After this initial depression a pronounced increase in acidity and acid output occurred. Secondary rises in acidity and acid output were noted in a few cases. These may be due to vagal-antral activation of gastric acid secretion without participation of the adrenocortical system. A more pronounced increase in gastric acid secretion and volume occurred with histamine than with insulin. As a result, no pH differences were found between insulin- and histamine-stimulated secretion.

450 REPEATED INSULIN TESTS IN PATIENTS WITH DUODENAL ULCER AFTER TRUNCAL VAGOTOMY AND PYLOROPLASTY. (E.) Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 5(8):703-706, 1970.

Duplicate determinations were made of basal gastric acid secretion and acid secretion during 8 15-min periods after injection of insulin (0.4 IE/kg i.v.) in 10 patients (9 men and 1 woman) with duodenal ulcers. Determinations were made 10-20 days after the patients underwent truncal vagotomy and a Heineke-Mikulicz pyloroplasty. According to the criteria of Hollander the results of these post-vagotomy insulin tests are reproducible in 9 of the 10 patients. The effect of vagotomy was best evaluated by reduction in the peak insulin acid output. These results conflict with literature reports that the dose of insulin required to produce a given degree of hypoglycemia varies from one individual to another and from day to day in the same individual.

451 GASTRIC ACID SECRETION IN CHINESE WITH PARTICULAR REFERENCE TO THE DOSE OF HISTAMINE REQUIRED FOR MAXIMAL STIMULATION. (E.) Fung, W. P. (U. Singapore Dept. Clin. Med., Singapore). *Gut* 11(11):955-961, 1970.

Basal gastric acid secretion and secretion after injection of 0.04 mg/kg body weight of histamine acid phosphate were studied in 203 Chinese patients with peptic ulcers (133 with duodenal ulcers, 57 with stomach ulcers, and 13 with both duodenal and stomach ulcers) and in 42 Chinese controls. In contrast to Western findings, both basal and histamine-stimulated gastric acid secretion were significantly higher in Chinese patients with stomach ulcers than in Chinese controls. Basal acid secretion values in Chinese duodenal ulcer patients and controls were essentially the same as those reported in the Western literature, but basal acid secretion in stomach ulcer patients was significantly higher. Values for histamine-stimulated secretion in Chinese duodenal ulcer patients and controls were significantly lower than values in all Western series to which they were compared, while values for Chinese stomach ulcer patients were either lower than or similar to Western values. In Chinese subjects, who are leaner than their Western counterparts, 0.06 mg/kg body weight of histamine acid phosphate is required for maximum stimulation of gastric acid secretion.

452 HISTOLOGICAL LOCALIZATION OF PLASMINOGEN ACTIVATOR AND PROTEOLYTIC ACTIVITY IN THE HUMAN STOMACH AND DUODENUM. (E.) Eras, P. (New York Hosp., N. Y.), P. Harpel and S. J. Winawer. *Gut* 11(10):851-854, 1970.

Examination of tissue from the stomach and duodenum of patients operated on for duodenal ulcers showed that plasminogen activator activity was present in mucosal and submucosal blood vessels of the gastric fundus, antrum, nnd duodenum. Nonspecific proteolytic activity, which was not inhibited by ε-aminocaproic acid or heat treatment of the fibrin substrate, was found in the surface epithelium of the stomach and duodenum, the gastric antral and fundal glands, antral submucosal fat, duodenal crypts, and duodenal glands. Plasminogen activator activity and proteolytic activity in the stomach and duodenum might be implicated in gastric and duodenal hemorrhages associated with a variety of disease states.

453 THE ROLE OF CHRONIC BLOOD LOSS IN THE PATHOGENESIS OF POSTGASTRECTOMY IRON-DEFICIENCY ANAEMIA. (E.) Holt, J. M. (Radcliffe Infirm., Oxford, England), M. W. L. Gear and G. T. Warner. *Gut* 11(10):847-850, 1970.

Chronic blood loss was measured for periods of up to 3 months in 13 patients (11 men and 2 women, aged 34-69 yr) who had undergone gastroenterostomy 5-24 yr before for peptic ulcers; 2 of these patients were also subjected to vagotomy. Blood loss was calculated from blood volume and the rate of loss in whole-body activity after injection of ^{59}Fe (4 µC i.v.). The calculated blood loss ranged from 0-300 ml/month. Six of 8 patients with a history of anemia lost blood at rates greater than normal (90-230 ml/month), and 3 of these 6 lost 200 ml or more/month. Contact bleeding was observed at gastroscopy in 4 of these 6 patients. Iron deficiency was diagnosed in 7 of the 10 patients on whom tests of iron absorption were carried out. Only 1 patient showed a compensatory increase in absorption of ferric iron, suggesting that in 6 patients the absorption of food iron would be poor and fail to increase in response to iron deficiency. Absorption of ferrous iron was not impaired.

454 ASSOCIATION BETWEEN BLOOD-PRESSURE AND PEPTIC-ULCER INCIDENCE. (E.) Medalie, J. H. (Tel Aviv U. Med. Sch., Israel), H. N. Neufeld, U. Goldbourt, H. A. Kahn, E. Riss and D. Oron. *Lancet* 2(7685):1225-1226, 1970.

A 5-yr prospective study of peptic ulcer in 8456 Israeli male Civil Service employees demonstrated that among the 4686, aged 40-49 at the beginning of the study, there is a close negative correlation between blood pressure and the subsequent development of peptic ulcer. This correlation is stronger for diastolic than for systolic blood pressure, but is clearly evident for both. When subjects were grouped according to birthplace (Israel, other Middle Eastern countries, Africa, Eastern Europe, Central Europe, and Southern Europe), this negative correlation was observed in all 6 groups. In subjects over age 50 yr the negative association is not beyond the limits that might reasonably be ascribed to chance.

455 RECURRENT ACUTE RETROGRADE INTRAGASTRIC INTUSSUSCEPTION. (E.) Williams, J. A. (Gen. Hosp., Birmingham, England) and J. F. Fielding. *Gut* 11(10):840-842, 1970.

Hematemesis and an acute retrograde intussusception of the efferent loop of the jejunum into the stomach occurred in a 45-yr-old man who had undergone an antecolic gastrojejunostomy for a duodenal ulcer 5 yr before. Since the intussusception was not reducible, the intussuscepted intestine was resected, the gastroenterostomy was closed, and a vagotomy and pyloroplasty were performed. The patient had been treated conservatively twice before for severe epigastric pain and hematemesis, but on these occasions the intussusception must have reduced spontaneously.

456 CHRONIC AFFERENT LOOP SYNDROME. (E.) Mitty, W. F., Jr. (New York U. Sch. Med., N. Y.), C. Grossi and T. F. Nealon, Jr. *Ann. Surg.* 172(6):996-1001, 1970.

Of 1000 patients who underwent subtotal gastric resections in a 10 yr period, 6 (3 men and 3 women, aged 32-55 yr) developed afferent loop syndrome and were reoperated. Symptoms developed 18 months to 20 yr after the original operation. Gastrojejunostomies were antecolic in 5 cases and retrocolic in 1. Surgical findings were: (1) torsion of the afferent loop due to adhesions from the anterior abdominal wall, (2) afferent loop obstruction secondary to herniation of the afferent loop into the stomach pouch, (3) partial obstruction of the afferent loop caused by 90° rotation of the efferent limb, (4) dilation of the afferent loop secondary to an adhesive band between the loop and the anterior abdominal wall, (5) stricture of the afferent loop, and (6) redundancy of the afferent loop. The following surgical procedures are recommended to correct this complication: (1) side-to-side enteroenterostomy, (2) conversion of a Billroth II to a Billroth I type anastomosis, (3) construction of a pantaloon type jejunojejunostomy, (4) revision of the gastric stoma, (5) interposition of a jejunal segment between the gastric pouch and duodenum, (6) resection of the redundant portion of the afferent loop, and (7) Tanner's modification of the Roux-en-Y with vagotomy.

457 DUODENAL ULCER AND RECURRENT DYSPEPSIA. (E.) Hodgkin, G. K. H. (Redcar, Yorkshire, England), R. Freedman, I. Fuller and J. Whewell. *Br. Med. J.* 2(5719):368-371, 1970.

Of 19,619 patients in northeastern England, 82 (4.2/1000) had a confirmed duodenal ulcer and 144 (7.3/1000) had dyspeptic symptoms suggestive of a duodenal ulcer but had either not undergone radiological examination or had previously had negative radiological findings. All patients with ulcer-type dyspepsia had had 2 or more attacks of upper abdominal pain during the previous 2 yr; 6 days or more combined duration of these attacks; and pain which was relieved by food, milk, or alkali. By means of radiological examinations duodenal ulcers were diagnosed in 46 of 95 men (50%) but in only 8 of 49 (16%) women. A previous radiological examination had been negative in 11 of the 46 men (25%) who had duodenal ulcers. The frequency of symptoms in patients with ulcer-type dyspepsia did not differ significantly from those in a group of 136 patients (109 males and 27 females) with duodenal ulcers. In both of these groups mean serum pepsinogen levels were significantly increased and the percentage of male and female nonsecretors of ABH antigens in their saliva and the percentage of male and female patients with blood group O were higher than in controls. These findings suggest that ulcer-type dyspepsia is produced by duodenitis which can progress to duodenal ulcer. The diagnosis and management of ulcer-type dyspepsia are discussed.

458 PERFORATED GASTRODUODENAL ULCER DISEASE AT THE MASSACHUSETTS GENERAL HOSPITAL FROM 1952 TO 1970. (E.) Donaldson, G. A. (Massachusetts Gen. Hosp., Boston) and F. Jarrett. *Am. J. Surg.* 120(3):306-311, 1970.

Of 471 patients admitted to Massachusetts General Hospital between 1952 and 1970 with acute gastroduodenal perforation, 68 (14%) died. These included 15 of 67 (22%) with gastric ulcers, 52 of 395 (13%) with duodenal ulcers, and 1 of 9 (11%) with marginal ulcers. The mortality in this series is lower than that in previously reported series, particularly among older patients. Little change has occurred in the mortality of conservatively-treated patients; 33 of 56 (59%) died. Of these 471 patients, 36 (7%) with duodenal ulcers had had previous perforations. Follow-ups made on 285 of the 402 survivors showed that 12 of the 22 gastric ulcer patients undergoing excision and closure or simple closure required definitive operations later and 10 remained free of ulcer symptoms. Of the 184 duodenal ulcer patients surviving conservative treatment or simple closure, 36% needed definitive surgery later, 21% continue to live with ulcer symptoms which require a bland diet and medication, and 43% are well with minor dietary restrictions. It is recommended that definitive surgery be performed if the patient's condition permits so that later surgery can be avoided.

459 DUODENAL ULCER AS A SECOND DISEASE. (E.) Monson, R. R. (Harvard Sch. Public Health, Boston, Mass.). *Gastroenterology* 59(5): 712-716, 1970.

On the basis of questionnaires mailed to male physicians in Massachusetts, the prevalence of coronary artery disease, chronic obstructive lung disease, rheumatoid arthritis, and diabetes mellitus was established in physicians with and without a history of duodenal ulcer. More physicians with duodenal ulcers reported having had each of the diseases studied except for diabetes mellitus. When adjustments were made for age and cigarette smoking, however, differences between duodenal ulcer patients and controls decreased somewhat, but the chronic bronchitis-pulmonary emphysema complex was still significantly more common among duodenal ulcer patients than among controls. Although differences in the prevalence of myocardial infarction among duodenal ulcer patients and controls were not statistically significant, it appears likely that the risk of myocardial infarction really is increased in duodenal ulcer patients since myocardial infarction is associated with an appreciable mortality which would logically be even higher among patients with both diseases.

460 PERSONALITY PATTERN AND EMOTIONAL STRESS IN THE GENESIS OF GASTRIC ULCER. (E.) Alp, M. H., J. H. Court and A. K. Grant (Queen Elizabeth Hosp., Woodville, Australia). *Gut* 11(9):773-777, 1970.

For 181 persons with a history of chronic gastric ulcer matched with controls for age and sex and questioned in a personality survey, increased incidence of ulcer was associated with domestic and financial stress, as well as with consumption of alcohol, aspirin and cigarettes. A personality pattern was established which includes self-sufficiency, independence, anxiety, and depression. Four factors were also determined by a neuroticism scale: tough- and tender-mindedness; cheerfulness versus depression; dominance or submission; and low and high anxiety. Resultant personality traits of patients with gastric ulcer include tough-mindedness, submission, and anxiety. This pattern is not characteristic of neurotic subjects. The character features appear to cause the ulceration, as opposed to being the result of an ulcer condition. This is supported by the knowledge that the dominant-submissive factor (genetically predetermined) and the tough-tender factor (due to early home influences) precede the appearance of ulcer. Although no correlation was found between the increased alcohol, aspirin, and cigarette consumption and the specific personality characteristics, it can be concluded that the interaction of personality structure, habituation, and personal situation does lead to gastric ulceration.

461 CURLING'S ULCER: A CLINICAL-PATHOLOGY STUDY OF 323 CASES. (E.) Pruitt, B. A., Jr. (US Army Inst. Surg. Res., Fort Sam Houston, Tex.), F. D. Foley and J. A. Moncrief. *Ann. Surg.* 172(4):523-539, 1970.

Of 2772 burn patients treated in a 16 yr period, 323 (253 males and 70 females, aged 35 days to 82 yr) or 11.7% had autopsy or clinical findings consistent with Curling's ulcer of the stomach and/or duodenum. The incidence of Curling's ulcer increased with increasing burn size to a maximum of 40% in patients with burns covering 70% or more of the body. It was demonstrated that Curling's ulcer was significantly more frequent in patients with septic complications (pneumonia, septicemia, suppurative thrombophlebitis, burn wound sepsis, and other septic processes) than in patients without these complications. This effect was especially evident in those with burns covering less than 50% of the body surface. The diagnosis of Curling's ulcer was made only at autopsy in 66 (22.7%) of 291 patients. The most common presenting symptoms were upper gastrointestinal hemorrhage (186 cases), hematemesis (135 cases), and melena (51 cases). Gastric ulcers were slightly more common than duodenal ulcers in the entire group of 393 patients, but in the 98 patients treated during the last 3 yr duodenal ulcers were somewhat more common than gastric ulcers. Both gastric and duodenal ulcers were found in about 15% and perforations occurred in 12%. Surgical treatment was required in 42 cases because of massive hemorrhage (32 cases), perforation (6 cases), and prolonged hemorrhage (4 cases). Vagotomy and antrectomy gave the best results but in some cases good results were also obtained with subtotal gastrectomy. Of the 42 operated patients, 20 died of causes related to surgery and 7 died later of burn complications.

462 PATHOPHYSIOLOGY OF PEPTIC ULCER. (Rev.) (E.) Menguy, R. (U. Chicago Dept. Surg., Ill.). *Am. J. Surg.* 120(3):282-288, 1970.

463 GASTRODUODENAL ULCER. (Rev.) (Fr.) Girard, M. *J. Med. Lyon* 51(1192): 1547-1556, 1970.

464 JUVENILE ULCERS. (E.) Prouty, M. (Jackson Clin., Madison, Wis.). *Am. Fam. Physician GP* 2(3):66-71, 1970.

465 COEXISTENT GASTRIC AND DUODENAL ULCER. SURVEY OF SIXTY CASES. (E.) Athanassiades, S. (U. Athens Sch. Med., Greece) and J. Charalambopoulou. *Am. J. Surg.* 120(3): 381-383, 1970.

466 CHRONIC GASTRITIS AND PEPTIC ULCER. (It.) Grassi, G. (St. Spirito Inst., Rome, Italy) and G. D'Onofrio. *Chir. Gastroenterol.* 4(4):347-356, 1970.

467 RECENT ADVANCES IN MEDICAL TREATMENT OF GASTRIC AND DUODENAL ULCER. (E.) Sama, S. K. (All-India Inst. Med. Sci., New Delhi) and M. P. Sharma. *Indian Pract.* 2(7): 433-436, 1970.

468 PERFORATED ACUTE GASTRODUODENAL ULCERS IN PATIENTS DYING WITHOUT SURGERY. (Sp.) Garcia Baron, A. (Valdecilla Health Clin., Santander, Spain). *Rev. Clin. Esp.* 118(3): 251-262, 1970.

469 THE CHOICE OF SURGERY IN PEPTIC ULCER DISEASE. (E.) Farmer, D. A. (Yale U. Sch. Med., New Haven, Conn.), H. W. Harrower and R. H. Smithwick. *Am. J. Surg.* 120(3):295-305, 1970.

470 ELECTIVE SURGERY FOR TREATMENT OF HEMORRHAGE FROM DUODENAL ULCER. (Rev.) (E.) Hallenbeck, G. A. (U. Alabama Sch. Med., Birmingham). *Gastroenterology* 59(5):784-789, 1970.

471 THE COMPARATIVE RESULTS OF DIFFERENT OPERATIONS IN THE ELECTIVE TREATMENT OF DUODENAL ULCER. (E.) Goligher, J. C. (Univ. Dept. Surg., Leeds, England). *Br. J. Surg.* 57(10):780-783, 1970.

472 TREATMENT OF PEPTIC ULCERS COMPLICATED BY GASTROCOLONIC FISTULA. (Rus.) Sitenko, V. M. and A. A. Kurygin. *Vestn. Khir.* 105(8):27-29, 1970.

473 THE MANAGEMENT OF SIDE EFFECTS OF SURGERY FOR PEPTIC ULCERATION. (E.) Johnston, D. A. (U. Newcastle upon Tyne Dept. Surg., England). *Br. J. Surg.* 57(10):787-794, 1970.

474 CANCER OF THE GASTRIC STUMP AFTER RESECTION FOR ULCERS. (Fr.) Saegesser, F. (Univ. Surg. Serv., Lausanne, Switzerland) and D. Waridel. *Schweiz. Med. Wochenschr.* 100(44):1871-1879, 1970.

475 GASTRIC INCONTINENCE AND POST-VAGOTOMY DIARRHOEA. (E.) McKelvey, S. T. D. (Queen's U. Dept. Surg., Belfast, Ireland). *Br. J. Surg.* 57(10):741-747, 1970.

476 EXTENT OF GASTRIC RESECTION IN DUODENAL PEPTIC ULCER PATIENTS. (Rus.) Maiat, V. S. and A. A. Grinberg. *Klin. Med. (Mosk.)* 48(8):125-130, 1970.

477 PHYSIOLOGY OF GASTRIC SECRETION AND ITS SIGNIFICANCE IN ULCER SURGERY. (Rev.) (Ger.) Peters, H. (Rhine-Westphalian Tech. Inst., Aachen, Germany). *Med. Klin.* 65(51):2246-2251, 1970.

478 GIANT STOMACH ULCERS: DEVELOPMENT AND TREATMENT. (Sp.) Zaragoza García, P. (Alcoy, Spain). *Rev. Esp. Enferm. Apar. Dig.* 32(8):873-884, 1970.

479 GASTRIC PERFORATION IN POLYARTERITIS NODOSA. REPORT OF A PATIENT. (E.) Gourgoutis, G. D. (VA Ctr., Dayton, Ohio), A. A. Paguirigan and T. Berzins. *Am. J. Dig. Dis.* 16(2):171-177, 1971.

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482 AFFERENT LOOP SYNDROME. (Rev.) (Sp.) Gugliotella, H. G. *Sem. Med. (B. Aires)* 137(8):282-288, 1970.

483 THE INTRINSIC FACTOR SECRETION IN LOCALIZED GASTRIC DISORDERS. (E.) Rodbro, P. (Glostrup Hosp., Denmark). *Acta Med. Scand.* 188(5):457-463, 1970.

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OF GASTRIC MUCOSA IN VARIOUS PATHOLOGICAL CONDITIONS. (E.) Mirelli, E. (U. Milan Endoscopy Ctr., Italy), G. Fichera, G. Ideo and A. Tittobello. *Acta Med. Iugosl.* 24(2):151-157, 1970.

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490 ORAL MUCOUS MEMBRANES IN PATIENTS WITH GASTRODUODENAL PEPTIC ULCER. (Rus.) Kolomiets, S. P. *Stomatologiia (Mosk.)* 5:19-24, 1970.

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500 REFLECTIONS ON PSYCHOLOGICAL FACTORS IN GASTRIC PATHOLOGY. (E.) Cesa Bianchi, M. (U. Milan, Italy) and F. Ravaccia. *Gazz. Sanit. (Milano)* 19(3):131-134, 1970.

501 CHRONIC FEAR AND ULCERS IN RATS AS A FUNCTION OF THE UNPREDICTABILITY OF SAFETY. (E.) Seligman, M. E. P. (Cornell U., Geneva, N. Y.) and B. Meyer. *J. Comp. Physiol. Psychol.* 73(2):202-207, 1970.

See also numbers: 144, 255, 257, 258, 259, 260, 296, 297, 298, 299, 300, 301, 302, 303, 304, 391, 395, 426, 431, 625, 643, 815, 861

502 DUODENAL ATRESIA AND STENOSIS IN INFANTS. (E.) Brimblecombe, F. S. W. (Exeter, England) and H. D. Moore. *Ann. Surg.* 172(6):991-995, 1970.

A duodenoplasty of the Heinecke and Mikulicz type was successfully used to correct duodenal atresia and stenosis in 6 infants (4 girls and 2 boys). One of the patients, who was operated 3 months after birth, had no opening at the site of stenosis. All 6 patients had associated abnormalities including 1 case of malrotated gut and 2 of Down's syndrome. Feeding p.o. was begun 11-37 hr after surgery. All 6 infants survived and none developed complications.

503 ILEOSIGMOID KNOTTING. (E.) Vaez-Zadeh, K. (Pahlavi U. Med. Sch., Shiraz, Iran) and W. Dutz. *Ann. Surg.* 172(6):1027-1033, 1970.

Observations made on 11 Iranian patients (9 men and 2 women, aged 18-67 yr) with ileosigmoid knotting suggest that this condition results from compression of a loop of the small intestine between a distended and twisted sigmoid colon and the anterior or posterior abdominal wall. The resulting obstruction and irritation of the bowel causes increased peristalsis, and subsequently leads to a rotation around the sigmoid loop with knot formation. Both loops then distend further, increasing the tightness of the knot and producing gangrene in one or both segments. None of these patients had histories of gastrointestinal disease except for 1 who had episodes of intestinal obstruction, probably due to sigmoid volvulus, 20 and 12 yr earlier which were relieved by enemas. Four of these patients survived, 1 died before surgery, and 6 died of complications which included dehiscence of the abdominal wound and anastomosis, mesenteric thrombosis, gangrene of the sigmoid, residual peritonitis, septic shock, and pneumonia.

504 ANTIPERISTALTIC JEJUNAL SEGMENTS FOR CONTROL OF THE DUMPING SYNDROME AND POSTVAGOTOMY DIARRHEA. (E.) Sawyers, J. L. (Vanderbilt U. Sch. Med., Nashville, Tenn.) and J. L. Herrington, Jr. *Surgery* 69(2):263-267, 1971.

Antiperistaltic (10 cm) jejunal segments were interposed between the gastric pouch and duodenum in 16 patients with intractable dumping syndrome. The addition of vagotomy is an added safeguard against pouch ulceration and did not result in obstruction. Results were excellent in 14 cases and good in 2; 1 patient had to be reoperated 1 yr after surgery because he had an incisional hernia. At this time the antiperistaltic jejunal segment was definitely dilated in comparison to the rest of the jejunum, but it did show active reversed peristaltic activity when stimulated. For correction of disabling postvagotomy diarrhea in 9 patients, a 10 cm antiperistaltic jejunal segment placed 100 cm distal to the ligament of Treitz was successful. This procedure reduced stool frequency; corrected weight loss, nutritional deficiencies, and anemia; and increased mouth-to-right-colon transit time. None of these patients developed intestinal obstruction.

505 MASSIVE SMALL BOWEL RESECTION IN THE BEAGLE, INCLUDING LABORATORY DATA IN SEVERE UNDERNUTRITION. (E.) Cuthbertson, E. M. (Bruce Kelham Surg. Lab., San Francisco, Calif.), R. S. Gilfillan, H. J. Burhenne and M. J. Mackby. *Surgery* 68(4):698-705, 1970.

Results of removing 85% of the ileum and jejunum in 35 beagles were poor. The 20 controls had simple resections and experimental animals had (1) reversed segments, (2) reversed segments and ileocolic valve bypass, (3) isoperistaltic circular loops, and (4) antiperistaltic loops. After 85% small bowel resection, the red cell volume, RBC, serum proteins, and serum calcium were consistently decreased. The plasma volume and total blood volume related to body weight were increased. Intestinal absorption of fat and protein were markedly decreased. Although food intake was greatly increased, large losses of body weight still occurred. Neither reversed segments nor recirculating loops were beneficial. Cinefluorographic studies revealed reduced small bowel transit time and a 30% increase in small bowel caliber. No measurable difference in the transit time was produced by the addition of circular loops or reversed segments except in 2 dogs which showed partial obstruction at the reversed segment. The failure of any of the surgical methods employed to improve consistently the condition of dogs after massive small bowel resection argues for the use of conservative measures in patients.

506 FOCAL AVILLOUS HYPERPLASIA OF THE MOUSE DUODENUM. (E.) Seronde, J., Jr. (Harriet G. Bird Mem. Lab., Stow, Mass.). *J. Pathol.* 100(4):245-248, 1970.

Weanling Princeton strain mice were fed a test diet of natural foodstuffs, a nutrient diet comprised of synthetic materials, or a pantothenic acid (vitamin B_5) -deficient diet for 4 weeks and examined for intestinal lesions. Pantothenic acid deficiency produced focal avillous hyperplasia in about 98% of the mice; about 83% on the synthetic diet and about 40% on the stock diet developed non-specific lesions similar to those of celiac disease. The lesions were flat plaques of parallel tubules, presumably arising from continuous multiplication of crypt epithelial cells; they were paired and located in the first cm of the duodenum. It is concluded that such superficial necrosis and ulceration leads to the acute chronic ulceration seen in mice on the pantothenic acid-deficient diet.

507 THE EFFECT OF FASTING ON DISACCHARIDASE ACTIVITY IN THE RAT SMALL INTESTINE.

(E.) McNeill, L. K. and J. R. Hamilton (Hosp. Sick Child., Toronto, Ontario, Canada). *Pediatrics* 47(1, Pt. 1):65-72, 1971.

Small intestinal segments from adult male Wistar rats fasted for up to 120 hr were analyzed for total weight, protein content, disaccharidase activity, and for structure and rate of migration of mucosal epithelial cells. Only 5 of the rats fasted more than 96 hr died of starvation; 48 hr after onset of fast the body weight, small intestinal weight, and amount of mucosal protein were significantly lower than in controls. In jejunal segments (immediately distal to the duodenum) maltase and sucrase activities did not differ for the 2 groups of rats, while the lactase activity increased after a 24-hr fast and remained significantly greater in fasted rats than in controls. For total small intestinal mucosa (remaining segments), maltase and sucrase activities were decreased in fasted rats, but an increase in lactase activity was seen after a 72-hr fast. No positive correlation was found between total enzyme activity and body weight, or between the small intestinal weight and mucosal protein content. However, positive correlations did exist between both sucrase and maltase activities and both intestinal weight and protein content. Morphological study showed a significant shortening of the jejunal villi, with fewer epithelial cells and a diminished rate of migration of these cells along the villi in fasted rats. It is concluded that the decreased maltase and sucrase activity is due to loss of the total epithelial cell mass in the small intestine. As lactase activity did not decrease, the activity of an acid β-galactosidase in the cytoplasm or lysosomes of epithelial cells was probably stimulated by fasting. The harmful effects of starvation on intestinal structure and function are emphasized, particularly in reference to undernutrition in childhood disease and its subsequent treatment.

508 ULTRASTRUCTURAL STUDY OF TWO CASES OF α-CHAIN DISEASE.

(E.) Scotto, J. (St. Antoine Hosp., Paris), H. Stralin and J. Caroli. *Gut* 11(9):782-788, 1970.

Electron microscope examinations were made of specimens of small intestine from 2 men, both under 30 yr of age, who had α-chain disease, an abdominal lymphoma characterized by severe malabsorption syndrome with malignant neoplasia involving the entire small intestine. Morphologically, cells involved in the neoplasia were similar to plasma cells, particularly those seen in typical multiple myeloma, in some forms of Waldenström's disease, or in a case of plasmacytic reticulum cell sarcoma. The finding of these cells, which secrete heavy-chain α-globulins, is consistent with the fact that plasma cells are the main source of immunoglobulins. In 1 case there was atrophy of the intestinal epithelium with rarefaction and shortening of the microvilli.

509 INVERTED VERSUS EVERTED GASTROINTESTINAL ANASTOMOSES: THE ROLE OF THE EVERTED MUCOSA IN ANASTOMOTIC BREAKDOWN.

(E.) Hearn, D. (Louisiana State U. Sch. Med., New Orleans) and I. Cohn, Jr. *Am. Surg.* 36(12):728-730, 1970.

Anastomoses were made in the ileum of 63 mongrel dogs by 3 methods: (1) classical inverting anastomosis with serosa-to-serosa approximation (11 cases); (2) everting anastomosis with mucosa-to-mucosa approximation and eversion of the lip of mucosa (26 cases); and (3) everting anastomosis with the mucosa removed from the everted lip and exposure of the submucosa and muscularis. In some animals of each group polyethylene film was sutured around the anastomosis and anchored to the mesentery on both sides of the intestine to isolate the anastomosis from the rest of the peritoneal cavity. All 11 dogs in group (1), including 6 with wrapped anastomoses, survived without any evidence of an anastomotic leak. In group (2), 12 of the 13 dogs with wrapped anastomoses died of peritonitis secondary to anastomotic breakdown while only 1 of the 13 with unwrapped anastomoses died of peritonitis. In group (3) only 4 of the 14 dogs with wrapped anastomoses developed peritonitis and died while all 12 with similar unwrapped anastomoses survived. These findings implicate the everted rim of the mucosa as the source of infection in anastomotic breakdown. Bacteria can proliferate more rapidly under the plastic wrapping, resulting in suture line infection and anastomotic disruption.

510 WATER ABSORPTION IN EXPERIMENTAL CLOSED SEGMENT OBSTRUCTION OF THE ILEUM IN MAN.

(E.) Wright, H. K. (Yale U. Sch. Med., New Haven, Conn.), J. J. O'Brien and M. D. Tilson. *Am. J. Surg.* 121(1):96-99, 1971.

In 4 male patients who had undergone total colectomy and ileostomy for ulcerative colitis, a 15 cm segment of the ileum was blocked off by inserting 2 balloons through the ileostomy and inflating them. The segment between the balloons was filled with an isotonic test solution, and intraluminal pressures were varied from 10-40 cm H_2O by varying the amount of fluid placed in this segment of the ileum. Absorption of fluid by the ileum increased at pressures up to 20 cm H_2O but decreased at 30 cm H_2O and almost ceased at 40 cm H_2O. In contrast, secretion of fluid into the lumen increased with increases in intraluminal pressure. These findings suggest that increased secretion is the primary cause of fluid loss and distension in closed loop intestinal obstruction and that decreased absorption is relatively less important.

511 TUMOROUS HETEROTOPIC GASTRIC MUCOSA IN THE SMALL INTESTINE. (Rev.) (E.) Lee, S. M. (Hitchcock Clin., Hanover, N. H.), W. T. Mosenthal and R. E. Weismann. *Arch. Surg.* 100(5):619-622, 1970.

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518 NEUROFIBROMA OF THE SMALL INTESTINE AS A CAUSE OF DIGESTIVE TRACT OBSTRUCTION. (Pol.) Waclaw-Musial, W. (Provinc. Hosp., Kielce, Poland). *Przegl. Lek.* 26, Pt. 2(8): 684-685, 1970.

519 SARCOMA OF THE SMALL INTESTINE. (E.) McElligott, M. *J. Ir. Med. Assoc.* 63(400):358-361, 1970.

520 LEIOMYOMA AND LEIOMYOSARCOMA OF THE SMALL INTESTINE. IMPORTANCE OF SELECTIVE ARTERIOGRAPHY. (Fr.) Tete, R., R. De Montgolfier and M. Piante. *J. Med. Lyon* 51(1192):1523-1530, 1970.

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See also numbers: 305, 306, 307, 308, 309, 310, 311, 312, 313, 318, 387, 416, 455, 456, 457, 543, 790, 826

REGIONAL ENTERITIS

539 CORTICOSTEROID OR CORTICOTROPHIN THERAPY IN CROHN'S DISEASE (REGIONAL ENTERITIS). (E.) Cooke, W. T. (Gen. Hosp., Birmingham, England) and J. F. Fielding. *Gut* 11(11)921-927, 1970.

Of 300 patients (143 men and 157 women) with Crohn's disease, followed between 1944 and 1968, 124 were given steroid therapy. The small intestine was involved in 91 cases and the large intestine in 33. ACTH (10-20 U/day i.m.) was given to 40 patients; prednisone, hydrocortisone, cortisone, and other corticosteroids (5-15 mg/day) were given p.o. to 32; a combination of oral steroids and ACTH was given to 44; and steroids were administered rectally in 8 cases. Dosages were individually adjusted. Evaluation of the short-term effects of therapy in 89 patients showed that only 24% failed to improve clinically within 6 months. A relatively greater proportion of patients receiving ACTH improved than those given oral steroids alone. Analysis of the long-term effects of steroid therapy showed that patients with small intestine involvement who received steroid therapy had a significantly greater risk of undergoing surgery at any time from 4-18 yr after diagnosis than did the controls. Steroid therapy did not lessen the risk of excision of the colon or affect the time after diagnosis at which it would be performed. The number of deaths in patients with Crohn's disease who were less than 40 yr old at onset was significantly higher than the expected frequency. There was also a significantly larger number of deaths among the steroid-treated group than among the controls. Death occurred in 24 of the 124 steriod-treated patients, a rate approximately 4 times that expected in the normal population and 2.5 times that among controls. Since 10 of these deaths were definitely caused by steroid therapy (malignant hypertension, hemorrhagic thrombocythemia, infections, bleeding gastric ulcer) and 2 were probably caused by steroid therapy (postoperative adrenal failure), the increased number of deaths among steroid-treated patients probably cannot be explained by statistical bias resulting from the more serious condition of these patients at diagnosis.

540 A COMPARATIVE RADIOGRAPHIC AND PATHOLOGICAL STUDY OF INTESTINAL VASO-ARCHITECTURE IN CROHN'S DISEASE AND IN ULCERATIVE COLITIS. (E.) Brahme, F. (Malmo Gen Hosp., Sweden) and C. Lindström. *Gut* 11(11):928-940, 1970.

Radiographic and histological findings made on sections of the large and small intestine removed from 9 patients with Crohn's disease and from 4 with ulcerative colitis suggest that vascular changes are not of primary importance in the development of either disease. In Crohn's disease vascular changes were secondary to fibrosis and edema of the intestinal wall. Ulcers were often found at points where the arteries broke through the muscularis propria. Hypervascularity was present in areas with deep ulcers and transmural inflammation, but vascular changes were barely discernible or absent in areas with small ulcers and moderate or mild inflammation. No histological changes compatible with thrombosis or infarction were observed. Mucosal and submucosal hypervascularity were found in active ulcerative colitis. The ulcers, most of which were shallow, were not anatomically related to specific vascular structures. In 1 case of chronic atrophic colitis no vascular changes were observed, even in areas of patchy, superficial premalignant changes in the mucosa.

541 LIVER DISEASE AND GALLSTONES IN REGIONAL ENTERITIS. (E.) Cohen, S. (New England Ctr. Hosp., Boston, Mass.), M. Kaplan, L. Gottlieb and J. Patterson. *Gastroenterology* 60(2):237-245, 1971.

Liver function tests (SGOT, serum alkaline phosphatase, prothrombin time, serum bilirubin, and BSP retention) were abnormal in 15 of 50 consecutive patients (27 men and 23 women, mean age 37 yr) with regional enteritis although none of these patients had any signs or symptoms of liver disease. The most common abnormalities were elevated serum alkaline phosphatase activities (12 of 50 patients) and increased BSP retention (12 patients of 35 tested). Pathological changes were found in 15 of 19 liver biopsies. Chronic pericholangitis was present in all 15, diffuse fatty metamorphosis in 2, focal fatty infiltration in 5, portal fibrosis in 5, and noncaseating granulomas in 2. The presence and severity of liver disease generally correlated with the severity of the enteritis. Bacterial infection, medication, or the presence of gallstones could not account for the biochemical and histological abnormalities found in these patients. A history of gallstones or radiological evidence of gallstones was found in 14 of these 50 patients. No cause for this unusually high prevalence of cholelithiasis was ascertained, but the findings suggest that it may be due to specific malabsorption of bile salts which would result in precipitation of cholesterol from the bile. In 2 cases an analysis of the gallstones revealed that they actually were composed of cholesterol.

542 CROHN'S DISEASE WITH PREDOMINANT INVOLVEMENT OF THE APPENDIX. (E.) Cohen, W. N. (Univ. Hosp., Iowa City, Iowa) and L. Denbesten. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):361-363, 1970.

543 ADENOCARCINOMA OF THE SMALL BOWEL COMPLICATING CROHN'S DISEASE. (E.) Goldman, L. I. (Temple U. Health Sci. Ctr., Philadelphia, Pa.), S. P. Bralow, W. Cox and A. R. Peale. *Cancer* 26(5):1119-1125, 1970.

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MALABSORPTION

545 AN EPIDEMIC OF TROPICAL SPRUE IN SOUTHERN INDIA. I. CLINICAL FEATURES. (E.) Mathan, V. I. (Christian Med. Coll. Hosp., Vellore, India) and S. J. Baker. *Ann. Trop. Med. Parasitol.* 64(4):439-451, 1970.

Among 1198 patients affected by an epidemic of tropical sprue which occurred in Madras State, South India, in 1960-1962, the most common clinical symptoms were persistent diarrhea which often lasted for months or years; malabsorption of fats, carbohydrates, and vitamin B_{12}; and signs of nutritional deficiency such as weight loss, night-blindness, glossitis, angular stomatitis, dyspigmentation of the hair, edema, and Bitot's spots. Jejunal biopsies from 40 patients showed mucosal thinning and increases in the thickness of the crypt layer in all cases, partial villous atrophy in 35, and mucosal atrophy in 5. In a group of 940 untreated patients, 276 died within the first 7 yr either of fluid and electrolyte loss or of deficiency states and secondary infections. During the first yr spontaneous remissions occurred in 74%, 21% died, and 5% continued to have symptoms into the second yr. Of the latter, 75% died, 8% had remissions, and 17% still had symptoms 8 hr later. Clinical improvement occurred in all patients hospitalized and treated for 3 weeks regardless of the type of therapy (antibiotics with or without folic acid, folic acid alone, or symptomatic treatment of diarrhea with kaolin or opium and belladonna). Vitamin B_{12} absorption, however, normalized more rapidly with antibiotic therapy.

546 AN EPIDEMIC OF TROPICAL SPRUE IN SOUTHERN INDIA. II. EPIDEMIOLOGY.
(E.) Baker, S. J. (Christian Med. Coll. Hosp., Vellore, India) and V. I. Mathan. *Ann. Trop. Med. Parasitol.* 64(4):453-467, 1970.

An epidemiological investigation of areas in Madras State where a tropical sprue epidemic occurred in 1961-1962 provides evidence that this disease is caused by an unidentified infectious agent. In this epidemic an estimated 100,000 of 6.2 million inhabitants were affected, and the mortality was approximately 30%. The mortality was highest in the age groups under 10 yr and in those over 60 yr. The incidence of diarrhea reached a maximum between October 1960 and December 1961. The percentage of the population affected varied widely from one village to another, ranging from 0-40%. Among non-Brahmins (caste Hindus, Jains, Christians, Muslims, and Harijans) the prevalence of the disease did not appear to be related to diet, socioeconomic factors, housing, or the source of drinking water, but only a very low percentage of Brahmins (1%) contracted the disease even though Brahmin children came into close contact with other children during school hours. This finding makes direct oral-fecal or respiratory transmission of an infectious agent unlikely. The majority of the population affected suffers from malnutrition and this may have contributed to the evolution of the epidemic, but there is no evidence to substantiate this theory. No differences were found between the dietary habits of affected and unaffected households, and no evidence was found to indicate that aflatoxin from peanuts or rancid fats played any etiological role in this epidemic of tropical sprue.

547 EPITHELIAL-CELL RENEWAL IN CULTURED DUODENAL BIOPSIES IN CELIAC SPRUE.
(E.) Trier, J. S. (Boston U. Sch. Med., Mass.) and T. H. Browning. *N. Engl. J. Med.* 283(23): 1245-1250, 1970.

Cell proliferation and migration were investigated in peroral biopsies of the small intestine from 3 normal males, aged 22-28 yr, and from 3 male patients with celiac sprue, aged 24-39 yr, before and 6-15 weeks after they were placed on a gluten-free diet. In vitro organ culture studies revealed that the number of epithelial cells incorporating ^{3}H-labeled thymidine from the culture medium into their nuclei was more than twice as great in biopsies from untreated patients as in biopsies from normal controls. This indicates that cellular proliferation is enhanced in celiac sprue. In 24 hr cultures from all untreated patients, labeled cells migrated to the surface epithelium while in cultures from controls labeled cells did not migrate beyond the lower one-third of the villi. Surface epithelial cells, which appeared damaged in uncultured biopsies from celiac sprue patients, reverted to normal after 24 hr of culture in a gluten-free environment. After 6-15 weeks of treatment with a gluten-free diet, cellular proliferation and migration in biopsies from celiac sprue patients was intermediate between that of pretreatment and normal biopsies. Thus, short-term diet therapy produces partial reversion of enhanced cell proliferation that characterizes untreated celiac sprue.

548 MALABSORPTION OF DIETARY FOLATE (PTEROYLPOLYGLUTAMATES) IN ADULT COELIAC DISEASE AND DERMATITIS HERPETIFORMIS.
(E.) Hoffbrand, A. V. (Roy. Postgrad. Med. Sch., London), A. P. Douglas, L. Fry and J. S. Stewart. *Br. Med. J.* 4(5727):85-89, 1970.

Folic acid and dietary folate absorption tests were performed on 10 patients (3 men and 7 women, aged 20-70 yr) with untreated celiac disease; 5 patients (2 men and 3 women, aged 30-51 yr) with dermatitis herpetiformis; 3 women, aged 52-62 yr, with megaloblastic anemia caused by dietary folate deficiency; and 14 normal controls. Folic acid absorption was impaired in 8 of the 10 patients with celiac disease and in 2 of the 5 with dermatitis herpetiformis but was normal in all 3 patients with dietary folate deficiency. Impaired dietary folate (pteroylpolyglutamate) absorption was found in all patients with celiac disease and in all but 1 of those with dermatitis herpetiformis but was normal in dietary folate deficiency. The activities of pteroylpolyglutamate hydrolase in the jejunal mucosa of these 3 groups of patients did not differ significantly from one another or from those of the controls. Thus, it is unlikely that impaired folate absorption observed in celiac disease and dermatitis herpetiformis is caused by a deficiency of pteroylpolyglutamate hydrolase, but it is possible that there may be a defect of the enzyme in vivo which is not reflected by reduction of the in vitro activity. Since the volume of epithelial cells is subnormal and the number of inflammatory cells is increased in a given volume of intestinal mucosa, it is conceivable that the total amount of enzyme is reduced in the mucosal absorptive cells in celiac disease.

549 PLASMA INSULIN RESPONSE TO ORAL CARBOHYDRATE IN PATIENTS WITH GLUCOSE AND LACTOSE MALABSORPTION. (E.) Maxwell, J. D. (King's Coll. Hosp., London), M. T. McKiddie, A. Ferguson and K. D. Buchanan. *Gut* 11(11):962-965, 1970.

Plasma insulin levels were determined in 12 patients (5 men and 7 women) with adult celiac disease after p.o. administration of 50 g glucose, in 4 male patients with alactasia after p.o. administration of 100 g lactose, and in age-matched controls. Glucose tolerance tests were run on 7 patients with celiac disease and 7 controls after i.v. injection of 25 g of glucose. A virtually identical sugar and plasma insulin response was obtained in celiac patients and controls after administration of glucose i.v., indicating that celiacs do not have a delayed or impaired pancreatic response to hyperglycemia. After p.o. glucose loading the insulin response in celiac patients was greater than expected from the small increase in blood sugar, and no correlation was found between plasma insulin and sugar levels at any period during the test. This finding supports the view that a factor responsible for stimulating insulin secretion is released from the intestine during or after glucose absorption. No insulin response was detected in patients with lactose malabsorption when lactose was administered p.o. This suggests that release of an insulin-stimulating factor does not depend merely on mucosal contact or indirect changes produced by the passage of carbohydrate into the lumen of the small intestine.

550 INCORPORATION OF L-LEUCINE-^{14}C INTO IMMUNOGLOBULINS BY JEJUNAL BIOPSIES OF PATIENTS WITH CELIAC SPRUE AND OTHER GASTROINTESTINAL DISEASES. (E.) Loeb, P. M. (Nat. Inst. Arthritis Metabol. Dis., Bethesda, Md.), W. Strober, Z. M. Falchuk and L. Laster. *J. Clin. Invest.* 50(3):559-569, 1971.

Studies of jejunal biopsy specimens showed that incorporation of ^{14}C-L-leucine into IgA was increased in 4 patients with celiac sprue and flat intestinal mucosas and was normal in one patient with celiac sprue and normal intestinal histology, but values for incorporation into total and soluble protein were within normal limits. Values were also normal for incorporation into total protein and IgA, and were increased for soluble protein, in patients with Whipple's disease in remission. Patients in immune deficiency states (hypogammaglobulinemia and IgA deficiency) had normal or increased incorporation into soluble and total protein and no incorporation into IgA. In the patients with celiac sprue, gluten challenge further stimulated the increased incorporation into total and soluble protein, IgA, and IgM; these changes were seen before changes in gastrointestinal absorption had occurred or serum IgA could be detected. It is concluded that this increased incorporation of leucine into immunoglobulins is an important feature in the pathogenesis of celiac sprue and other malabsorption diseases.

551 AN ELECTRON-MICROSCOPE STUDY OF BACTERIA IN TWO CASES OF WHIPPLE'S DISEASE. (E.) Roberts, D. M. (British Milit. Hosp., Munster, Germany), H. Themann, F.-J. Knust, F. E. Preston and J. R. Donaldson. *J. Pathol.* 100(4):249-255, 1970.

For 2 cases of Whipple's disease, light and electron microscopic study of jejunal biopsies taken before and after treatment with chloramphenicol and ampicillin indicated that bacterial infection is significant in the pathogenesis of the disease. Before treatment, gram-negative bacteria and degenerative forms of the bacteria were seen predominantly in the lamina propria of the small intestine, and occasionally in the lymphatic system and intestinal epithelium, such as the distal portions of the villi. The presence of bacteria gave rise to more macrophages which are considered responsible for some disease pathology; content of the foamy macrophages included ingested bacteria and periodic acid-Schiff-positive granules. The source of the bacterial infection is not certain; invasion of intestinal mucosa or systemic infection through skin wounds are suggested. As treatment of the patients with antibiotics normalized the histological picture, it is concluded that bacterial disturbance of absorptive cell function and the existence of a mechanical barrier due to bacteria and macrophages in the mucosa, as well as some bacterial invasion of the lymphatic system, are partially responsible for the malabsorption found in Whipple's disease.

552 GASTROINTESTINAL PROTEIN LOSS IN ALLERGY TO COW'S MILK β-LACTOGLOBULIN. (E.) Lebenthal, E. (Beilinson Med. Ctr., Petah Tikva, Israel), J. Laor, Z. Lewitus, Y. Matoth and S. Freier. *Isr. J. Med. Sci.* 6(4):506-510, 1970.

Milk intolerance in 3 female infants was attributed to an allergic reaction to β-lactoglobulin in cow's milk. Gastrointestinal protein loss was shown by such symptoms as diarrhea, vomiting, pallor, and weight loss from several min to several hr after ingestion; in 2 of the 3 infants, asthma and eczema were also seen. Sensitivity was similar for cow or goat milk, or β-lactoglobulin alone. When ^{51}Cr-labeled albumin was administered i.v., excretion in the feces markedly increased and the half-life of albumin in the plasma was shortened, indicating protein loss. Symptoms, hypoalbuminemia, and iron-deficiency anemia were eliminated by change to a soybean preparation; one infant lost her sensitivity to milk by age 1 yr.

553 FREQUENCY AND NATURE OF RELAPSES IN CHILDREN SUFFERING FROM THE MALABSORPTION SYNDROME WITH GLUTEN INTOLERANCE. (E.) Visakorpi, J. K. (U. Helsinki Child. Hosp., Finland), P. Kuitunen and E. Savilahti. *Acta Paediatr. Scand.* 59(5):481-486, 1970.

A study was made of the effects of reintroducing gluten in the diets of 23 children who had malabsorption syndrome and gluten intolerance during the first 2 yr of life. The average age of the patients at diagnosis was 9.7 months and the duration of the initial gluten-free diet ranged from 0.6-25 months. During follow-up periods of 0.2-6.5 yr, 8 of the 23 children had clinically manifest relapses and 15 remained asymptomatic. However, 14 of these 15 asymptomatic patients had either subtotal or partial villous atrophy of the mucosa in the small intestine. In addition, 2 of these 14 patients had abnormal D-xylose absorption tests, 1 had steatorrhea, and some had abnormal immunological findings. The only patient who showed no abnormalities in clinical findings or mucosal morphology after being on a normal diet for 4.6 yr had typical symptoms of celiac disease initially and reacted to gluten in a provocation test, but the diagnosis had not been verified by a biopsy taken before diet therapy was begun. Of the 8 patients who relapsed, all responded to reintroduction of the gluten-free diet and 3 remained asymptomatic but had abnormal biopsy findings after being given a diet containing wheat. Long-term therapy with a gluten-free diet in 5 cases produced improvements in the appearance of the intestinal mucosa as well as a remission of symptoms. It is concluded that asymptomatic relapses can be detected only by biopsy findings since absorption tests and immunological tests were negative in most of these patients.

554 ENTEROCYTE IN COELIAC DISEASE. I. (Rev.) (E.) Booth, C. C. (Roy. Postgrad. Med. Sch., London). *Br. Med. J.* 3(5725):725-731, 1970.

555 WHIPPLE'S DISEASE IN A PATIENT WITH STRONGYLOIDIASIS. ULTRASTRUCTURAL AND HISTOENZYMOLOGICAL STUDY OF THE JEJUNAL MUCOSA. (Fr.) Monges, H. (Northern Hosp., Marseille, France), H. Revil and J. Delmont. *Arch. Fr. Mal. App. Dig.* 59(9):525-538, 1970.

556 LACTASE DEFICIENCY IN JEWISH COMMUNITIES IN ISRAEL. (E.) Gilat, T. (Ichilov Hosp., Tel Aviv, Israel), R. Kuhn, E. Gelman and O. Mizrahy. *Am. J. Dig. Dis.* 15(10):895-904, 1970.

557 ISOLATED LACTASE DEFICIENCY IN HUMANS: REPORT ON 100 PATIENTS. (E.) Welsh, J. D. (U. Oklahoma Med. Ctr., Oklahoma City). *Medicine (Baltimore)* 49(4):257-277, 1970.

558 CLINICAL AND IMMUNOLOGICAL PERSPECTIVES IN FOOD SENSITIVITY. A REVIEW. (Rev.) (E.) Goldstein, G. B. (U. California Dept. Pediatr., Los Angeles) and D. C. Heiner. *J. Allergy.* 46(5):270-291, 1970.

559 MALABSORPTION IN DOGS. (E.) Hill, F. W. G. (U. Bristol Dept. Vet. Med., England). *Vet. Rec.* 87(17):495-496, 1970.

560 DISACCHARIDASES OF THE JEJUNAL MUCOSA IN ADULTS WITH INTESTINAL MALABSORPTION AND DIARRHEA. (Fr.) Vachon, A. (Debrousse Hosp., Lyon, France), J. Cotte and M. Abry. *J. Med. Lyon* 51(1192):1533-1543, 1970.

561 CYSTIC LYMPHANGIOMA OF THE MESENTERY WITH TEMPORARY MALABSORPTION. (Fr.) Geffroy, Y. (CHU Clin. Med. Serv., Rouen, France), R. Colin and R. Laumonier. *Ann. Gastroenterol. Hepatol. (Paris)* 6(5):367-377, 1970.

562 POSTGASTRECTOMY STEATORRHEA. (Rev.) (E.) MacKay, C. (U. Glasgow Western Infirm., England). *Am. J. Surg.* 120(3):324-328, 1970.

563 INTESTINAL ABSORPTION IN UREMIC PATIENTS. (Por.) Rongel Rocha, P. P. (Univ. Sch. Med. Sci., Rio de Janeiro, Guanabara, Brazil), E. Jurado Da Silva, E. Sarno and A. Amancio. *Rev. Assoc. Med. Bras.* 16(7):219-222, 1970.

564 ON THE QUESTION OF PSORIATIC ENTEROPATHY. (E.) Preger, L. (U. California Dept. Radiol., San Francisco), H. I. Maibach and R. B. Osborne. *Arch. Dermatol.* 102(2):151-153, 1970.

565 HISTOCHEMICAL AND ULTRASTRUCTURAL CHANGES OBSERVED IN THE MUCOSA OF THE ILEAL CONDUIT. (E.) Guerrero Alcazar, M. (Mexican Inst. Soc. Secur., Mexico City), A. Gonzalez Angulo and F. Ortiz Quesada. *J. Urol.* 104(3):406-412, 1970.

See also numbers: 261, 262, 263, 264, 314, 442, 510, 647, 692, 694, 827

566 WOUNDS OF THE RECTUM. (E.) Lung, J. A. (Fitzsimons Army Gen. Hosp., Denver, Colo.), R. P. Turk, R. E. Miller and B. Eiseman. *Ann. Surg.* 172(6):985-990, 1970.

An analysis is made of 23 perforating wounds of the rectum incurred by soldiers in combat and 1 resulting from a trunk accident. Most of these injuries were inflicted by anti-personnel devices and high-velocity weapons. Two-thirds of the rectal wounds were associated with major damage to other structures such as the genito-urinary tract (10 cases), sciatic nerve (4 cases), and autonomic nervous system with resulting impotence (3 cases). Debridement and colostomy with subsequent colostomy closure was followed by at least one complication in 18 cases. The complications were most commonly due to retained foreign bodies (5 cases) and inadequate drainage (7 cases). Complications consisted of abscesses (15 cases), hemorrhage (5 cases), fistulas (8 cases) and intestinal obstruction (3 cases).

567 RADIOLOGICAL DIAGNOSIS OF RECURRENT COLONIC CARCINOMA AT THE ANASTOMOSIS. (E.) Bartram, C. (Westminster Hosp., London) and J. E. Hale. *Gut* 11(9):778-781, 1970.

In 23 patients who had undergone a conventional 2-layer, end-to-end anastomosis of the colon for cancer, radiological examination with a barium enema revealed a constant constriction at the site of the anastomosis in all but 3 cases. The contour of the anastomosis was smooth and symmetrical and had a regular mucosal pattern. In contrast, 3 patients who developed recurrent carcinomas at the anastomosis had irregular filling defects which, in 1 case, was erroneously attributed to inversion of the bowel by sutures. It is recommended that examinations be made 6 weeks after surgery when healing has occurred. Mucosal irregularity and constriction were present in 2 cases in which examinations were performed 3 weeks after surgery; normal symmetrical constriction later became evident.

568 HYPERPLASTIC MUCOSAL CHANGES IN THE RABBIT COLON PRODUCED BY DEGRADED CARRAGEENIN. (E.) Watt, J. (U. Liverpool Dept. Pathol., England) and R. Marcus. *Gastroenterology* 59(5):760-768, 1970.

The effects of degraded carrageenin (from the red seaweed Eucheuma spinosum) on rabbit colonic mucosa were investigated histologically over a period of 3 months. All of the rabbits fed degraded carrageenin in their drinking fluid at the 1% level developed ulcers; ulcers were also present in 3 of 6 animals receiving carrageenin at the 0.1% level and were mostly confined to cecal and proximal colonic mucosa. The mucosa, which was grossly thickened in 3 of 6 animals fed 1% solutions, exhibited small, sessile, polypoid formations of 2 types which measured up to 0.3 cm in diameter and in height. Pseudopolyps consisted of edematous congested mucosa, often infiltrated with acute inflammatory cells and occurring particularly at ulcer margins. Glandular polyps consisted of markedly thickened mucosa, with pronounced hyperplasia in the mucosal glands and chronic inflammatory cell infiltration of varying degree. The epithelium of the glandular acini was often multilayered and mitoses were frequent. The hyperplastic epithelial cells were regularly arranged and showed no evidence of malignancy. Hyperplastic mucosal changes in rabbits receiving the 0.1% solution were observed on microscopic examination only. The use of carrageenin as a therapeutic agent or as a food additive will have to be reconsidered.

569 THE INFLUENCE OF VAGOTOMY ON THE COLON. (E.) Connell, A. M. (Queen's U. Dept. Surg., Belfast, Ireland) and S. T. D. McKelvey. *Proc. R. Soc. Med.* 63(Suppl.):7-9, 1970.

The effects of vagotomy on the distal colonic segmental response to eating was studied in 21 patients (13 had undergone truncal vagotomy and 8 had selective vagotomy); in all cases vagotomy was combined with a Finney type pyloroplasty. Under resting conditions intraluminal pressure patterns in the sigmoid colon and upper rectum were not significantly different from normal following vagotomy and pyloroplasty. There was no difference in either resting, post-prandial pressures, or the response to eating in patients who had selective or truncal vagotomy. While there was no colonic response to a normal hospital meal, there were large sigmoidal and rectal responses to a fluid meal in these patients. It is postulated that small intestine receptors are necessary for the initiation of the gastrocolic segmenting response.

570 MOTOR RESPONSES IN UNRESECTED AND RESECTED DIVERTICULAR DISEASE OF THE COLON. (E.) Parks, T. G. (Univ. Hosp. Ctr., Sherbrooke, Quebec, Canada). *Proc. R. Soc. Med.* 63(Suppl.):3-6, 1970.

The resistance to stretching of the colonic and rectal muscles in 28 patients with unresected diverticular disease was compared with the responses in 14 patients who had had previous sigmoid resection for diverticular disease and 15 control subjects with first degree hemorrhoids and no colonic disease, to determine if weakness in the colonic wall was related to the development of mucosal herniation. In all 3 groups, colonic and rectal contractions in response to stretching were much stronger and more sustained than spontaneous contractions. In controls there was a consistent increase in tone with each increment of distension, with the tension in the colonic wall being higher and increasing more rapidly with larger volumes, than in either of the other 2 groups. In patients with diverticular disease or with previous resection of the diverticular segment, the tension which developed in response to additional increments was much less than in control subjects. It appears that the apparently normal segment remaining after sigmoid resection for diverticular disease is abnormal in terms of its resistance to stretching.

571 DIVERTICULAR DISEASE OF THE COLON. NEW OBSERVATIONS AND REVISED CONCEPTS. (E.) Fleischner, F. G. (T. R. Hendrix, Johns Hopkins Hosp., Baltimore, Md.). *Gastroenterology* 60(2):316-324, 1971.

Two different advanced types of diverticulosis, both of which are sequelae of different types of irritable colon syndrome, differ in their gross appearance, distribution, and pathogenesis. Simple massed diverticulosis usually involves the descending and sigmoid colon and distorts the colon by redistribution of tissue without inflammatory or cicatricial changes. In some cases the diarrheal, painless form of irritable colon syndrome is a precursor of simple massed diverticulosis. Mucosal hernias appear to be forced through weakened colonic wall structures, primarily the circular muscle layer, by normal or increased intraluminal pressure. The second type of diverticulosis, spastic colon diverticulosis, is usually limited to the sigmoid and lower descending colon and produces a characteristic saw-toothed deformity which, in about 1/3 of the cases, develops without inflammation. The striking muscular thickening, which is accompanied by shortening and narrowing of the sigmoid, is termed "myochosis." The gross changes in the sigmoid result from hypermotility, rearrangement, or hypertrophy of the musculature. Clinical manifestations of acute diverticulitis are not caused by inflammation in a diverticulum, but by micro- or macroperforation of diverticula resulting in deep sigmoiditis, perisigmoiditis, or manifest peritonitis. If diverticulosis is causally related to irritable colon syndrome, the incidence of diverticulosis could be reduced by successful treatment of patients with irritable colon. In this way the incidence of intestinal perforation or diverticulitis would also be reduced.

572 ETIOLOGY OF COLONIC ANASTOMOTIC LEAKS. (E.) Hawley, P. R. (U. California Sch. Med., San Francisco), T. K. Hunt and J. E. Dunphy. *Proc. R. Soc. Med.* 63(Suppl.):28-30, 1970.

The effect of hemorrhage, distant trauma, and infection on the integrity of colon anastomoses was studied in rabbits. Anastomoses which were infected were weaker than those with associated hemorrhage or trauma. Bursting pressures of infected anastomoses were significantly lower at 7 days than those observed in normal controls. A significant increase in the incidence of spontaneous breakdown occurred in anastomoses which were excluded from the peritoneal cavity by a piece of autoclaved latex. Use of a continuous atraumatic suture in one layer precluded the leakage of organisms after completion of the anastomosis. If a single interrupted layer of sutures was used, there was complete sealing of the anastomosis after approximately 1 hr. In the infected anastomosis there is increased breakdown of mature collagen due to an increase in collagenase production and an increase in the formation of new collagen which has low tensile strength.

573 THE ANORECTAL MYENTERIC PLEXUS: ITS RELATION TO HYPOGANGLIONOSIS OF THE COLON. (E.) Weinberg, A. G. (Child. Med. Ctr., Dallas, Tex.). *Am. J. Clin. Pathol.* 54(4): 637-642, 1970.

Specimens from the distal anorectal myenteric plexus were taken at autopsy from 25 patients, ranging from premature infants to children 6 yr of age, to better define the anatomy of this region. A lack of ganglion cells and the presence of nonmyelinated nerve trunks characterized a distal zone which was similar to hypoganglionic areas associated with Hirschsprung's disease. This zone can extend up to 2.5 cm proximal to Hilton's line or 2 cm proximal to the pectinate line, and tends to increase slightly in length with age. Rectal biopsies for the diagnosis of Hirschsprung's disease should be taken proximal to this region to preclude the possibility of a false-positive diagnosis.

574 JUVENILE POLYPS OF THE COLON. (E.) Holgersen, L. O., R. E. Miller (St. Luke's Hosp., New York, N. Y.) and H. A. Zintel. *Surgery* 69(2):288-293, 1971.

An analysis was made of records of patients (55, 20 yr of age or younger) presenting with polyps of the colon. A sharp decline in the number of polyps was seen after the first decade of life. The most common symptoms were bleeding (53 patients, 95%) and prolapse of the polyp through the rectum (21 patients, 37%). Most of the 89 polyps (69%) were located in the rectum and rectosigmoid. Fourteen patients (25%) had more than one polyp and 1 patient had 9. Polyps were removed through the sigmoidoscope or by direct ligation at the anal orifice in 48 patients and 12 had colotomies for removal of polyps which were beyond the reach of the sigmoidoscope. Whereas significantly symptomatic polyps should be removed, prophylactic removal of colonic polyps is not indicated if laparotomy must be performed.

575 FREE URINARY AMINO ACID EXCRETION IN PATIENTS WITH FAMILIAL POLYPOSIS OF THE COLON. (E.) Sachatello, C. R. (U. Kentucky Med. Sch., Lexington) and G. Tritsch. *J. Surg. Oncol.* 2(4):359-362, 1970.

Determinations were made of free neutral and acidic amino acid excretion in 24 hr urine specimens from 5 patients belonging to 3 kindreds with an unequivocal family history of polyposis of the colon extending back for at least 3 generations. These subjects included a 50-yr-old man and his 12-yr-old son who both had osteomas but no evidence of polyps. Free urinary amino acid excretion was in the normal range in 4 of these 5 patients. The single exception was a patient who had undergone total proctocolectomy and had ileostomy dysfunction; the low values in this case are consistent with malabsorption. Increased hydroxyproline excretion was not found in 2 patients from the same kindred who have extensive intramesenteric desmoids. Free urinary amino acid excretion patterns were very similar in 2 brothers, one of whom has Klinefelter's syndrome with an XXY karyotype while the other is a normal male with a normal karyotype. Thus, the extra X chromosome in Klinefelter's syndrome apparently has no effect on free urinary amino acid excretion.

576 THE OCCURRENCE OF DESMOIDS IN PATIENTS WITH FAMILIAL POLYPOSIS COLI. (E.) McAdam, W. A. F. (U. Leeds Gen. Infirm., England) and J. C. Goligher. *Br. J. Surg.* 57(8):618-631, 1970.

Desmoid tumors developed in 4 patients (3 males and 1 female, aged 15-33 yr) with polyposis coli. Two of these patients also had Gardner's syndrome; one died of urinary complications resulting from an intra-abdominal desmoid. Another patient died of carcinomatosis involving the liver. Another surviving patient has ureteric compression from an enlarging inoperable desmoid between the leaves of the mesentery. A summary is presented of 89 literature reports on desmoids occurring in patients with polyposis coli. The serious complications resulting from histologically benign desmoids are stressed.

577 GASTROINTESTINAL CANCER. AUTOPSY CASE. (Jap.) Mori, S. (Byoin Natl. Sanatorium, Fukuoka, Japan), M. Kawabe and Y. Iwamoto. *Iryo* 24(6):491-496, 1970.

578 MULTIPLE PRIMARY TUMOURS OF THE LARGE INTESTINE. (It.) Sartoni-Galloni, S. (Maggiore Hosp., Bologna, Italy), P. Pavlica and G. Cavara. *Riv. Radiol.* 10(1):63-73, 1970.

579 PRIMARY CANCER OF THE APPENDIX (CASE REPORT). (Fr.) Tete, R., M. Piante and R. De Montgolfier. *J. Med. Lyon* 51(1192): 1509-1521, 1970.

580 INTUSSUSCEPTION OF THE APPENDIX SIMULATING CARCINOMA OF THE CECUM. (E.) Howard, R. J. (U. Minnesota Med. Sch., Minneapolis), C. M. C. Ellis and J. P. Delaney. *Arch. Surg.* 101(4):520-522, 1970.

581 COLON CANCER AS A CAUSE OF ILEUS. (Rus.) Kaltcheva, V. *Med. Probl. (Plovdiv)* 22(1-2):100, 1970.

582 CARCINOMA OF THE COLON FOLLOWING URETEROSIGMOIDOSTOMY: REPORT OF A CASE. (E.) Oetjen, L. H., Jr. (1300 S. Orange Ave., Orlando, Fla.), J. L. Campbell, M. W. Thomley and R. L. Parsons. *J. Urol.* 104(4):536-537, 1970.

583 SURVIVAL OF PATIENTS AFTER COLONIC RESECTION FOR CARCINOMA WITH SIMULTANEOUS LIVER METASTASES. (E.) Cady, B. (Boston City Hosp., Mass.), D. O. Monson and N. W. Swinton, Sr. *Surg. Gynecol. Obstet.* 131(4):697-700, 1970.

584 TUMOUR GIANT CELLS IN RECTAL CARCINOMA. (E.) Chang, A. R. (U. Otago Med. Sch., Dunedin, New Zealand), H. G. Penman. *J. Pathol.* 101(1):65-66, 1970.

585 EPIDERMOID CARCINOMA OF THE ANORECTUM. (E.) Stearns, M. W., Jr. (Mem. Hosp. Cancer Allied Dis., New York, N. Y.) and S. H. Q. Quan. *Surg. Gynecol. Obstet.* 131(5):953-957, 1970.

586 TERATOID CYST OF THE CECUM. (E.) Kay, S. (Med. Coll. Virginia, Richmond). *Am. J. Dig. Dis.* 16(3):265-268, 1971.

587 PROBLEMS OF RECTAL PROLAPSE. (Rev.) (E.) Anonymous. *Br. Med. J.* 4(5732): 381-382, 1970.

588 THE ORIGIN OF ANORECTAL FISTULAS. (E.) Hill, J. R. (Mayo Clin. Found., Rochester, Minn.). *J. La. State Med. Soc.* 122(7):211-215, 1970.

589 TOXIC MEGACOLON. (Sp.) Font Pascual, J. (Juan XXIII Hyg. Clin., Tarragona, Spain), C. A. Henriquez and J. Curto Cardus. *Rev. Esp. Enferm. Apar. Dig.* 32(3):289-294, 1970.

590 DIVERTICULUM OF THE LARGE INTESTINE. (Ger.) Filippini, L. (Canton Hosp.,

Luzern, Switzerland). *Dtsch. Med. Wochenschr.* 95(43):2190-2192, 1970.

591 COLONIC DIVERTICULITIS WITH PERFORATION TO REGION OF LEFT HIP: A RARE COMPLICATION. REPORT OF A CASE. (E.) Farmer, R. G., F. L. Weakley, H. J. Klein and C. M. Evarts. *Cleve. Clin. Q.* 37(3):161-165, 1970.

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See also numbers: 9, 265, 315, 316, 317, 318, 319, 420, 537, 538, 885

608 THE CONTENT OF EOSINOPHIL GRANULOCYTES IN THE COLONIC MUCOSA IN ULCERATIVE COLITIS. (E.) Binder, V. (Gentofte Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 5(8):707-712, 1970.

The number of eosinophilic granulocytes/square mm was calculated for 149 biopsies from the colonic mucosa of 74 patients with ulcerative colitis (27 men and 47 women, aged 15-75 yr); 42 patients with other diseases of the colon (8 with irritable colon, 7 with acute enterocolitis, 3 with diverticula of the large intestine, 18 with chronic diarrhea, and 6 with Crohn's disease); and 17 patients with no symptoms of colon disease. There were highly significant differences between these 3 groups in eosinophilia in the lamina propria of the large intestine. Of the 90 specimens from ulcerative colitis patients, 34 (38%) had eosinophilia within the normal range and 56 (62%) had eosinophilia of more than 3% (highest normal value 2.7%). The 56 specimens in the latter group came from 46 patients who did not differ in age, sex, or duration of the disease from the entire group of ulcerative colitis patients. The only positive correlations found were between the number of eosinophilic granulocytes and the total number of cells in the lamina propria and between the percentage of eosinophils and clinical activity of the disease. No correlations were found between tissue eosinophilia and treatment, food intolerance, extracolonic manifestations, the clinical course of the disease, or atopic and delayed hypersensitivity diseases in the patients and their relatives.

609 EXAMINATION OF THE INFLAMMATORY REACTION IN ULCERATIVE COLITIS BY USE OF THE SKIN-WINDOW TECHNIQUE. (E.) Binder, V. (Gentofte Hosp., Hellerup, Denmark) and P. Riis. *Scand. J. Gastroenterol.* 5(8):641-645, 1970.

The skin-window technique was used to study the effect of intradermal injection of autologous homogenates of colonic mucosa in 20 patients (14 women and 6 men, aged 21-72 yr) with ulcerative colitis and in 6 controls (4 with irritable colon and 2 with Crohn's disease localized in the terminal ileum). None of the patients had allergic diseases or skin diseases. All subjects received a simultaneous intradermal injection of isotonic saline in a control skin window. In 12 of the 20 ulcerative colitis patients basophilic granulocytes were found in skin windows during the second 24 hr period, both after injection of colon homogenate and isotonic saline. These 12 patients with basophilia did not differ from the others in age, sex, duration or severity of the disease, allergic predisposition, or occurrence of extracolonic manifestations.

610 A COMPARISON OF PERSONALITY TRAITS IN ULCERATIVE COLITIS AND MIGRAINE PATIENTS. (E.) Schucman, H. (Columbia U. Coll. Physicians Surg., New York, N. Y.) and W. N. Thetford. *J. Abnorm. Psychol.* 76(3, Pt. 1): 443-452, 1970.

The Personality Assessment System was used to relate personality traits to patterns of performance on the Wechsler I.Q. test in 35 subjects with ulcerative colitis and in 207 controls, aged 18-40 yr. The ulcerative colitis patients were predominantly internalizers, ideationally dominant, self-sufficient, physically inactive subjects who seek their major psychological satisfactions in the privacy of their own experience and are poorly equipped to deal with situations which require environmental awareness, perceptual acuity, concrete problem-solving, and interpersonal closeness. In general, ulcerative colitis patients who had not suffered serious recurrences during a 10-yr period were mostly primitive externalizers while those who had suffered severe exacerbations during this period were mostly more tension-prone uncompensated internalizers. Subjects with flexible personalities were also more common among the ulcerative colitis patients. These individuals, because of their broad range of reactivity and tendency to respond diffusely, find it difficult to concentrate and are likely to become confused and even chaotic if they do not learn control. Patients who had improved generally had abandoned the ulcer-prone direction at the contact level, becoming significantly better regulated and more stable than unimproved patients. A large majority of the ulcerative colitis patients were role adaptive, remaining both uncompensated and unmodified in the course of their development. Serious maladaptive dysfunction would thus be anticipated in these patients. The results of this study provides additional support for the validity of the Personality Assessment System.

611 ULCERATIVE COLITIS: CLINICAL FINDINGS IN 95 CASES. (Fr.) De La Pierre, M. (U. Turin Inst. Clin. Ther. Med., Italy), C. Sategna-Guidetti and C. Saracco. *Acta Gastroenterol. Belg.* 33(7):542-572, 1970.

An analysis was made of clinical findings made on 95 patients (61.1% female and 38.9% male) treated for ulcerative colitis between 1959 and 1968. About one-third of these patients were aged 21-30 yr at onset, but one patient developed acute fulminating ulcerative colitis at 5.5 yr and 2 patients with acute localized forms were over 72 yr old at onset. About 64% of the patients were first seen 1-4 yr after the onset of symptoms. In 2 cases other family members had ulcerative colitis. There were no differences between the dietary habits of these patients and those of healthy subjects in the same social category: almost all of the patients had been breast-fed as infants. Personality disorders were evident in 14 of the 65 patients interviewed and 22 of these patients were under emotional stress although this was not necessarily chronologically related to onset of the disease; no cause-effect relationship was established. The onset was acute in 30 cases, subacute in 39, and poorly defined in 24. The predominant symptom was bloody diarrhea in 47 cases, colic in 16, hemorrhoids in 16, meteorism in 7, fever in 5, and constipation in 4. Severe and very severe forms accounted for 14.7% of these cases. Clinical findings were more closely correlated with rectoscopic than with radiological findings. Local complications were found in 56.7% of the patients examined. These included pseudopolyposis, stenosis of the large intestine, megacolon, hemorrhoids, anal fistula, and cancer of the large intestine. Generalized complications were found in 37.9% of these patients and included different types of dermatitis, monoarticular arthritis, cirrhosis, kidney stones, hepatitis, Raynaud's disease, and a fistula of the parotid gland. Slight changes were noted in the function of the liver, pancreas, and small intestine in a fairly large percentage of cases. Pancreatic bicarbonate secretion tended to be high and xylose absorption was increased in 5 out of 22 patients. Of 79 patients who were followed, 52 had recurrences which, in 54.7% of all cases, were seasonal and occurred in the spring or fall. Colectomies were performed on 13 patients and 10 of these 95 patients died. Salazosulfapyridine gave the best results with mild forms of ulcerative colitis, but even some patients with acute generalized forms responded to this treatment. Cortisone or cortisone derivatives were used only for patients with refractory cases. No improvement occurred in 3 patients with chronic hyperplastic ulcerative colitis treated with radioactive gold perfused locally.

612 CARCINOMA OF THE BILIARY TRACT COMPLICATING CHRONIC ULCERATIVE COLITIS. (E.) Morowitz, D. A. (Washington Hosp. Ctr., D. C.), S. Glagov, E. Dordal and J. B. Kirsner. *Cancer* 27(2):356-361, 1971.

Autopsy revealed carcinoma of the bile ducts or gallbladder in 3 patients (2 men, 1 woman) who had long-term ulcerative colitis; 2 of the 3 had a history of chronic hepatobiliary symptoms including jaundice, cholestasis, liver fibrosis, and cirrhosis. Two of the 3 patients showed signs of chronic biliary inflammation, whereas mild ulcerative colitis was the only symptom present for about 20 yr in a woman who died of carcinoma of the gallbladder but had no stones in the gallbladder or ducts. Association of the 2 disorders in these 3 patients is considered more than coincidental for 2 reasons: both are relatively uncommon diseases and the average age of the patients (38 yr) is significantly lower than for patients with biliary tract neoplasms alone (generally between ages 40-80 yr). The possibility of serious complications occurring in cases of ulcerative colitis with evidence of jaundice and biliary disorder is stressed.

613 ARTHROPATHY, ANKYLOSING SPONDYLITIS, AND CLUBBING OF FINGERS IN ULCERATIVE COLITIS. (E.) Jalan, K. N. (Western Gen. Hosp., Edinburgh, Scotland), R. J. Prescott, R. J. Walker, W. Sircus, J. P. A. McManus and W. I. Card. *Gut* 11(9):748-754, 1970.

A retrospective analysis of 399 patients with ulcerative colitis revealed that 27 (6.8%) had colitic arthritis, 17 (4.2%) had clinical ankylosing spondylitis, and 20 (5%) had clubbing of the fingers. Patients with Crohn's disease, ischemic colitis, rheumatoid arthritis, osteoarthritis, and psoriatic and gouty arthritis were excluded. Clubbing of the fingers was related to the severity, extent of involvement, and duration of the colitis. Positive associations were found between clubbing of the fingers and carcinoma of the colon, pseudopolyposis, toxic dilatation of the colon, and arthropathy. Of these 399 patients, 9 developed cancer and 3 of these patients had clubbing of the fingers. Although colitic arthritis and ankylosing spondylitis were not related to the severity, extent of involvement, or duration of the colitis, arthritis was positively correlated with other complications of ulcerative colitis such as pseudopolyposis, perianal disease, eye lesions, skin eruptions, aphthous ulcers, and liver disease. A significant correlation was also found between colitic arthritis and ankylosing spondylitis; 7 patients had both of these conditions. Colitic arthritis disappeared in all but 1 patient after removal of the large intestine, but ankylosing spondylitis did not regress after proctocolectomy. This suggests that 2 different disease processes are involved, but it is possible that functional differences between central and peripheral joints explain the differences in the behavior of these joints after surgery.

614 ULCERATIVE COLITIS. (Rev.) (E.) Bouchier, I. A. D. (Roy. Free Hosp., London). *Br. J. Clin. Pract.* 24(10):409-416, 1970.

615 ULCERATIVE COLITIS. (E.) Perlmann, P. *Folia Allergol. (Roma)* 17(4):434-435, 1970.

616 LONG TERM HYPERALIMENTATION IN ULCERATIVE COLITIS. (E.) Gimpel, A. (U. Oklahoma Med. Ctr., Oklahoma City) and J. A. Schilling. *J. Okla. State Med. Assoc.* 63(8): 371-375, 1970.

617 ANGIOGRAPHIC STUDIES IN CROHN'S DISEASE AND ULCERATIVE COLITIS. (E.) Erikson, U. (Univ. Hosp., Uppsala, Sweden), S. Fagerberg, U. Krause and L. Olding. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2): 385-392, 1970.

618 RECTAL BIOPSY IN CHRONIC ULCERATIVE COLITIS. (Sp.) Pérez Fernández, E. (Clin. Hosp., Montevideo, Uruguay), L. Falconi and T. Kvasina. *Rev. Esp. Enferm. Apar. Dig.* 32(8):857-872, 1970.

619 NONSPECIFIC ULCERATIVE RECTOCOLITIS: A NEW TECHNIQUE FOR ITS SURGICAL TREATMENT BY RETRORECTAL REDUCTION OF THE ILEUM WITH TEMPORARY PERINEAL ILEOSTOMY. (Por.) Haddad, J. (U. Sao Paulo Sch. Med., Brazil). *Arq. Gastroenterol.* 7(4):187-195, 1970.

620 GASTRIC INVOLVEMENT IN HEMORRHAGIC RECTOCOLITIS. (ONE CASE). (Fr.) Pérol, C. (Lariboisiere Hosp., Paris, France), A. Galian, H. Rajaona, J.-P. Ferrier, P. Hautefeuille and J. Roujeau. *Arch. Fr. Mal. App. Dig.* 59(12): 781-792, 1970.

621 IMMUNOLOGIC ASPECTS OF ULCERATIVE COLITIS. (Rev.) (E.) Huizenga, K. A. (Mayo Clin., Rochester, Minn.), R. G. Shorter and R. J. Spencer. *South. Med. J.* 63(8):954-960, 1970.

622 IMMUNOLOGICAL ASPECTS OF NONSPECIFIC ULCERATIVE COLITIS. (Sp.) Waks, J. (Rivadavia 4986, Buenos Aires, Argentina). *Prena Med. Argent.* 57(20):980-984, 1970.

623 AUTOIMMUNITY THEORY ON THE PATHOGENESIS OF ULCERATIVE COLITIS. (Rev.) (Rum.) Spirchez, T. and I. N. State. *Med. Interna (Bucur.)* 22(6):677-686, 1970.

624 ELECTRICAL POTENTIALS OF THE SIGMOID COLON AND RECTUM IN IRRITABLE BOWEL SYNDROME AND ULCERATIVE COLITIS. (E.) Edmonds, C. J. (Univ. Coll. Hosp. Med. Sch., London). *Gut* 11(10):867-874, 1970.

See also numbers: 510, 540, 558, 850, 886, 887, 889

625 THE ACIDITY AND ELECTROLYTE CONCENTRATIONS OF GASTRIC JUICE IN PATIENTS WITH MUCOVISCIDOSIS. (Ger.) Stoll, E. (U. Bern Pediatr. Clin., Switzerland), F. Halter, H. Gaze, R. Richterich and E. Rossi. *Helv. Paediatr. Acta* 25(3):234-241, 1970.

In the standard pentagastrin test no differences were found between gastric secretory volumes, mean pH values during fasting and after pentagastrin stimulation, the course of H^+ secretion, or mean Na^+, Cl^-, K^+, or Ca^{++} concentrations in the gastric juice of 9 children, aged 6-14 yr, with mucoviscidosis and 9 normal controls in the same age range. These results suggest that duodenal ulcers in patients with mucoviscidosis could only be due to failure of bicarbonate in the duodenum to neutralize acid from the gastric juice.

626 LIVER FUNCTION STUDIES AND BILIARY TRACT INVESTIGATIONS IN MUCOVISCIDOSIS. (E.) Feigelson, J. (49 Blvd. Bessieres, Paris), Y. Pecau and J. Sauvegrain. *Acta Paediatr. Scand.* 59(5):539-544, 1970.

Liver function tests and radiological examinations of the gallbladder were performed in 30 children (10 boys and 20 girls, aged 18 months to 18 yr) suffering from cystic fibrosis, including 2 with clinically manifest cirrhosis. Small shrunken gallbladders were found in 9 cases, in 3 of which irregularities of the gallbladder outlines might have been due to submucosal cysts. In 17 cases the gallbladder was normal and in 4 it could not be visualized. No relation was found between gallbladder abnormalities and age; gallbladder abnormalities were found in patients of all ages. BSP excretion tests performed on 27 of these patients were normal in 20, moderately abnormal in 5, and frankly pathological in the 2 cirrhotic patients. Only 3 patients with gallbladder abnormalities had abnormal BSP tests, and there was no correlation between abdominal pain and gallbladder abnormalities. Serum alkaline phosphatase activities were elevated in 7 patients, 3 of whom also had abnormal BSP excretion tests. Prothrombin levels were usually normal in most patients, but sometimes fell to 40% of normal and, in 1 patient, dropped to 28% 2 months before death.

627 PANCREATIC ISLET CELL TUMOUR WITH WATERY DIARRHOEA AND HYPOKALAEMIA. (E.) Stoker, D. J. (St. George's Hosp., London) and V. Wynn. *Gut* 11(11):911-920, 1970.

A case report is presented for a 61-yr-old woman with profuse watery diarrhea, hypokalemia, and a non-β islet cell of the pancreas. She did not have gastric hypersecretion or peptic ulcer. Since diarrhea persisted after removal of the tumor, a total pancreatectomy was performed. The patient responded to surgery but developed recurrent diarrhea which responded temporarily to prednisolone and neomycin therapy and later to ACTH therapy. The patient died 15 months after pancreatectomy. Autopsy revealed 5 metastases from the islet cell carcinoma in the liver and severe renal hypertension. It is suggested that secretin or a hormone with a similar action might account for the symptoms by interfering with intestinal absorption of water and sodium.

628 THE ELECTROLYTE AND PROTEIN CONTENTS AND OUTPUTS IN DUODENAL JUICE AFTER PANCREOZYMIN AND SECRETIN STIMULATION IN NORMAL CHILDREN AND IN PATIENTS WITH CYSTIC FIBROSIS. (E.) Zoppi, G. (U. Ferrara Pediatr. Clin., Italy), D. H. Shmerling, D. Gaburro and A. Prader. *Acta Paediatr. Scand.* 59(6):692-696, 1970.

Twelve normal children and 5 with cystic fibrosis received 2 IU/kg of both pancreozymin and secretin and the duodenal contents were sampled in 10-min periods, twice after pancreozymin and 3 times after secretin. At 50 min after stimulation with pancreozymin and secretin, the patients showed significant decreases in duodenal levels of chymotrypsin, trypsin, carboxypeptidase A, α-amylase and lipase. Decreases were also seen in volume (20% of normal values), protein (63%), bicarbonate (9%), sodium (18%), potassium (25%), calcium (33%), and magnesium (60%). In controls the secretion rates of sodium and bicarbonate were higher after secretin stimulation, while those of protein, calcium, and magnesium were higher after pancreozymin stimulation; secretion rates of total fluid and potassium did not differ significantly. In cystic patients, the secretion rates of sodium, potassium, and magnesium were more reduced after secretin while those of calcium and protein were more reduced after pancreozymin; secretion rates of total fluid and bicarbonate were reduced similarly by both hormones.

629 LIGATION VERSUS IMPLANTATION OF THE PANCREATIC DUCT AFTER PANCREATICODUODENECTOMY. (E.) Goldsmith, H. S., B. C. Ghosh (Mem. Sloan-Kettering Cancer Ctr., New York, N. Y.) and A. G. Huvos. *Surg. Gynecol. Obstet.* 132(1):87-92, 1971.

A retrospective study of 79 patients (50 males and 29 females, aged 7 months to 83 yr) compared the results of pancreatic duct ligation (45 cases) and reimplantation of the pancreatic duct into the gastrointestinal tract (34 cases). Postoperative complications and survival were about the same in these 2 groups of patients. Of 16 autopsied patients, 8 had undergone pancreatic duct ligation and 8 reimplantation. Both the gross and histological appearance of the pancreas was the same in these 2 groups of patients. Major findings included pancreatic atrophy and scarring, proximal duct dilatation and stenosis, diffuse fibrosis, normal acinar cell structure, well-preserved α- and β-cells, hypertrophied islet cells, and lack of lymphocytic infiltration. From these findings it is concluded that reimplantation of the pancreatic duct into the intestinal tract is an unnecessary step.

630 TOTAL PANCREATECTOMY. (E.) ReMine, W. H. (Mayo Clin., Rochester, Minn.), J. T. Priestley, E. S. Judd and J. N. King. *Ann. Surg.* 172(4):595-604, 1970.

The results of total pancreatectomy are analyzed in 36 patients who were operated on for cancer of the pancreas (23 cases), benign islet-cell tumors of the pancreas (10 cases), and severe and intractable chronic relapsing pancreatitis (3 cases). Minimal to 3/4 gastric resection was performed in all cases, and the duodenum was completely resected in 29 cases and partially resected in 7. Biliary-intestinal anastomosis was performed by choledochojejunostomy or hepaticojejunostomy in 30 cases, by cholecystojejunostomy and choledodochoduodenostomy in 2 cases each, and by cholecystogastrostomy and choledochogastrostomy in 1 case each. Cholecystectomy was performed in 18 cases, splenectomy in 30, and vagotomy in 3. Five cancer patients and 1 with an islet-cell tumor died postoperatively (operative mortality, 16.7%). Follow-up showed that 11 of 19 patients survived for 5 yr or more after surgery. Lymph node involvement was present in 10 of the 23 cancer patients. One of these patients lived 6.5 years after total pancreatectomy when he died of pulmonary metastasis. Of the patients with chronic pancreatitis, 2 died from complications of diabetes and 1 survived for 8 yr before developing a massive gastrointestinal hemorrhage of unknown origin. These results suggest that total pancreatectomy should be employed instead of partial pancreatectomy for surgical treatment of pancreatic carcinoma.

631 PANCREATIC CARCINOMA. (Rev.) (E.) Watson, D. W. (U. Michigan Med. Ctr., Ann Arbor). *Am. J. Dig. Dis.* 15(8):767-773, 1970.

632 INITIAL STAGES OF CARCINOMA OF THE PANCREAS. (Jap.) Ishii, K. (Natl. Cancer Ctr. Hosp., Tokyo). *Stomach Intest. (Tokyo)* 5(10):1225-1232, 1970.

633 CARCINOMA OF THE PANCREAS BEGINNING WITH MEDIASTINAL SYMPTOMS. (Sp.) Muro, J. (La Paz Social Security Clin., Madrid, Spain), J. Ortiz Vazquez, J. L. Villalobos and M. Patron. *Rev. Clin. Esp.* 118(3):263-270, 1970.

634 OSTEOBLASTIC METASTASES IN CARCINOMA OF PANCREAS. (E.) Gillison, E. W. (Roy. Hosp., Sheffield, England), R. G. Grainger and D. Fernandez. *Br. J. Radiol.* 43(515):818-820, 1970.

635 PANCREATIC MALIGNANCY IN CHILDREN. (E.) Grosfeld, J. L. (Ohio State U. Coll. Med., Columbus), H. W. Clatworthy, Jr. and A. B. Hamoudi. *Arch. Surg.* 101(3):370-375, 1970.

636 PAPILLARY EPITHELIAL NEOPLASM OF PANCREAS IN A CHILD. REPORT OF A CASE WITH ELECTRON MICROSCOPY. (E.) Hamoudi, A. B. (Ohio State U. Dept. Pathol., Columbus), K. Misugi, J. L. Grosfeld and C. B. Reiner. *Cancer* 26(5):1126-1134, 1970.

637 MASSIVE GASTRIC DILATATION COMPLICATING HYPOTONIC DUODENOGRAPHY. A REPORT OF THREE CASES. (E.) Gelfand, D. W. (U. Cincinnati Coll. Med., Ohio) and M. Moskowitz. *Radiology* 97(3):637-639, 1970.

638 EXTENSIVE PLEURAL EFFUSIONS DURING ACUTE NECROSIS OF THE PANCREAS OR DURING ITS REMISSIONS. (Fr.) Stoppa, R. (Univ. Hosp. Ctr., Amiens, France), X. Henry and J. Petit. *Chir. Gastroenterol.* 49(4):405-410, 1970.

See also numbers: 261, 265, 266, 267, 268, 269, 307, 320, 340, 559, 692, 736, 825

PANCREATITIS

639 TRANSPERITONEAL ABSORPTION OF AMYLASE IN ACUTE EXPERIMENTAL PANCREATITIS. (E.) Waterman, N. G. (U. Louisville Sch. Med., Ky.) and R. S. Walsky. *Surg. Gynecol. Obstet.* 131(4):729-732, 1970.

Amylase activities in serum, pancreatic fluid, and peritoneal fluid were measured in guinea pigs with acute pancreatitis induced by a solution of sodium taurocholate and trypsin. Serum and peritoneal fluid amylase activities were significantly higher in guinea pigs with pancreatitis in which the pancreatic fluid was absorbed transperitoneally than in normal controls. Serum amylase activities were significantly lower in guinea pigs with pancreatitis in which the pancreatic fluid was aspirated to reduce absorption than in the group in which transperitoneal absorption was permitted to occur. A comparison of the multiples of the measured volumes of fluid aspirated and amylase concentration indicated that dilution of the pancreatic fluid by an outpouring of fluid occurs and decreases the amylase activities. The increases in serum amylase concentration during acute pancreatitis appears to be due primarily to transperitoneal absorption rather than to direct venous drainage from the pancreas.

640 HYPERPARATHYROIDISM AND ACUTE POST-PARTUM PANCREATITIS WITH NEONATAL TETANY IN THE CHILD. (E.) Bronsky, D. (Cook County Hosp., Chicago, Ill.), M. G. Weisbery, M. C. Gross and J. J. Barton. *Am. J. Med. Sci.* 260(3):160-164, 1970.

An 18-yr-old primipara under treatment for hypertension was admitted with ruptured membranes at term. After 38 hr, when spontaneous labor failed to occur, medical induction was performed. Six hr after delivery the patient went into shock. Surgical exploration of the abdomen disclosed acute hemorrhagic pancreatitis. Biochemical determinations revealed persistent hypercalcemia and hypophosphatemia consistent with a diagnosis of hyperparathyroidism. Serum calcium levels were not decreased by cortisone (200 mg/day for 2 weeks). Chief-cell adenoma of a parathyroid gland was resected and her serum calcium and phosphate returned to normal. At age 12 days, her child developed tetany, hypocalcemia, and hyperphosphatemia. Treatment with vitamin D and calcium salts caused improvement of the child's condition. The pancreatitis in the patient is attributed to coexisting hyperparathyroidism.

641 EXPERIMENTAL PANCREATITIS INTENSIFIED BY A HIGH FAT DIET. (E.) Haig, T. H. B. (U. Saskatchewan Dept. Surg., Saskatoon, Canada). *Surg. Gynecol. Obstet.* 131(5):914-918, 1970.

Adult mongrel dogs, given a high-fat diet for 6 weeks, were more susceptible to pancreatitis induced by infusion of bile and trypsin into the pancreas than dogs fed high-protein, high-carbohydrate, balanced, or moist commercial diets. Autopsies performed 48 hr after surgery were supplemented by microscopic pathological examination. The high-carbohydrate diet slightly decreased the susceptibility to bile-trypsin pancreatitis, but this effect was not as pronounced as the increased susceptibility due to the high-fat diet. Histological examination supported these autopsy findings, and indicated a duct-oriented lesion and variable, but secondary, vascular injury. It is concluded that high fat intake, obesity, and other factors can be associated with a susceptibility to acute pancreatitis, although the mechanism of association is unknown.

642 ACUTE HEMORRHAGIC PANCREATITIS. AN EXPERIMENTAL TECHNIQUE FOR PRODUCING THE DISEASE IN CANINES. (E.) Khedroo, L. G. (St. Elizabeth Hosp., Chicago, Ill.) and P. A. Casella. *Int. Surg.* 54(5):348-352, 1970.

An experimental technique for producing acute hemorrhagic pancreatitis in dogs is described. Following a midline abdominal incision 10 ml of bile are withdrawn from the mobilized gallbladder. The larger pancreatic accessory duct is identified, mobilized, and ligated distally at its juncture with the duodenum, this being followed by cannulation with polyethylene tubing. A mixture of 10 ml of the dog's own bile plus crystalline trypsin (10,000 U) is injected into the duct system under moderate unmeasured pressure. Following injection the tube is removed and the pancreatic duct ligated proximally. Within 15 minutes, the pancreatic exudate becomes partially hemorrhagic in character. Microscopic and gross findings at autopsy confirmed the presence of pancreatitis. The gross lesions include hemorrhagic pancreatic swelling, 50 to 200 ml blood-tinged fluid within the peritoneal cavity, omental fat necrosis, and peripancreatic fatty tissue. Microscopic findings include RBC infiltration in the perilobular tissues, acinar disruption and necrosis, and leukocyte and lymphocyte infiltration of the periductal and periacinar tissues. Serum amylase, lipase, and transaminase activities are usually, but not necessarily, correlated with the severity of the pancreatitis.

643 FATAL ACUTE PANCREATITIS. A CLINICOPATHOLOGIC ANALYSIS. (E.) Whalen, J. (New Jersey Coll. Med. Dent., Newark), B. Rush, E. Albano and E. Lazaro. *Am. J. Surg.* 121(1): 16-19, 1971.

An analysis is made of 80 patients who died of acute pancreatitis: 50 (average age 54.2 yr) had been hospitalized and 20 (average age 39.7 yr) died without receiving medical care and were autopsied by the medical examiner. In hospitalized patients principal autopsy findings were fatty necrosis of the liver and ascites (40 cases), acute liver disease (38 cases), acute or chronic renal disease (22 cases), chronic liver disease (9 cases), and acute cholecystitis (6 cases) whereas peptic ulcer (15 cases) was the most common finding in untreated subjects. Because of associated disease which obscured the primary diagnosis and normal or moderately elevated serum amylase activities, pancreatitis was not diagnosed in 43 of the 50 hospital patients; in 5 cases pancreatitis apparently developed after admission. Hemorrhagic necrotizing pancreatitis was the form most commonly found in hospital patients while edematous pancreatitis was the most common form among nonhospitalized subjects. This suggests that edematous pancreatitis is the earlier lesion which subsequently leads to hemorrhagic and suppurative pancreatitis.

644 SURGICAL TREATMENT OF ACUTE NECROTIZING PANCREATITIS. (E.) Lawson, D. W. (Massachusetts Gen. Hosp., Boston), W. M. Daggett, J. M. Civetta, R. J. Corry and M. K. Bartlett. *Ann. Surg.* 172(4):605-617, 1970.

Surgical treatment was selected for 15 patients with acute pancreatitis due to alcoholism (8 cases), biliary calculi (3 cases), and trauma, previous surgery, and viral infection (1 case each). Hypocalcemia was present in 13 cases and shock in 11. Prior to surgery all but 2 patients either required endotracheal intubation for respiratory distress or pressors for blood pressure maintenance. Surgery consisted of biliary and gastrointestinal decompression by cholecystostomy, gastrostomy, and jejunostomy. Multiple drains were placed i.p. and the peripancreatic and retroperitoneal areas were drained with a sump pump. Of these 15 patients, 11 survived surgery and recovered after 11-124 days; the other 4 died 11-35 days after surgery. Autopsies performed in 3 cases revealed massive pancreatic necrosis and bilateral pneumonia. Intra-abdominal and retroperitoneal hemorrhage from the necrotic pancreas was a contributing cause of death in 2 of these 4 cases. Among the survivors immediate improvement occurred in cardiovascular and respiratory disorders, but duodenal obstruction or dilatation was a complication in 7 cases, staphylococcal or pseudomonas pneumonia in 6, and biliary infection in 7. Follow-up of the survivors showed that pancreatitis recurred in 5 cases, but these later attacks were far less severe and responded readily to conservative therapy.

645 ISOLATED TRAUMA TO THE PANCREAS AND LATER DEVELOPMENT OF PANCREATITIS. (Pol.) Taniewski, W. (Gen. Hosp., Warsaw, Poland) and A. Zbrodowski. *Wiad. Lek.* 23(17):1511-1513, 1970.

646 ACTIVITY OF PANCREATIC ENZYMES IN EXPERIMENTAL NECROSIS OF THE PANCREAS. (E.) Toth, B. (Univ. Med. Sch., Budapest, Hungary), G. Nemeth and I. Farkas. *Acta Physiol. Acad. Sci. Hung.* 37(3-4):401-402, 1970.

647 CHRONIC PANCREATITIS AND MALABSORPTION. (Sp.) Galindo, F. (Dr. Carlos Bonorino Udaondo Hosp. Gastroenterol., Buenos Aires, Argentina), A. Schapira, E. E. Crosetti and L. A. Boerr. *Sem. Med. (B. Aires)* 136(40):1455-1459, 1970.

648 CHRONIC RELAPSING PANCREATITIS IN CHILDHOOD: CASE REPORT AND REVIEW OF THE LITERATURE. (Rev.) (E.) Dean, R. H. (Vanderbilt U. Med. Ctr., Nashville, Tenn.), H. W. Scott, Jr. and D. H. Law, IV. *Ann. Surg.* 173(3):443-447, 1970.

649 DRUGS USED IN TREATMENT OF ACUTE PANCREATITIS. (Pol.) Piksa, M. (Med. Acad. Inst. Pharmacol., Szczecin, Poland). *Farm. Polska* 26(11):997-1003, 1970.

650 RELATIONS BETWEEN THE EXOCRINE AND ENDOCRINE PANCREAS. PANCREATITIS AND DIABETES. (Sp.) Silva Pozo, J. (La Paz Social Security Health Clin., Madrid, Spain), P. Martinez Martinez, J. Villamor Leon, A. Perez Carnero and J. Vazquez Rodriguez. *Rev. Esp. Enferm. Apar. Dig.* 32(4):373-394, 1970.

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651 CUTANEOUS PORPHYRIA DUE TO A MALIGNANT PRIMARY HEPATOMA. (E.) Thompson, R. P. H., D. C. Nicholson, T. Farnan, D. N. Whitmore and R. Williams (King's Coll. Hosp., London). *Gastroenterology* 59(5):779-783, 1970.

The first case of porphyria with photosensitivity due to primary hepatic cell carcinoma is described in a noncirrhotic 77-yr-old woman. Biopsied tumor tissue showed strong red fluorescence in UV light and contained 1.9 μg/g of coproporphyrin and 0.3 μg/g of uroporphyrin. No porphyrin was found in normal liver cells, suggesting that the tumor cells were the site of excess porphyrin synthesis. A marked increase occurred in fecal and urinary porphyrin excretion after intra-arterial infusion of 5-fluorouracil, and this increase was accompanied by some improvement in the liver scan. Since a similar increase in porphyrin excretion did not occur after radiotherapy (1400 rad), it is concluded that 5-fluorouracil probably caused necrosis or damage to the tumor cells. The defect in the tumor cells responsible for these alterations in porphyrin metabolism is unknown. At autopsy the liver contained multiple tumor nodules, including many with hemorrhagic centers. No evidence of cirrhosis was found.

652 HEPATITIS-ASSOCIATED ANTIGEN IN UGANDAN PATIENTS WITH HEPATOCELLULAR CARCINOMA. (E.) Vogel, C. L. (Uganda Cancer Inst., Kampala), N. Mody, P. P. Anthony and L. F. Barker. *Lancet* 2(7674):621-624, 1970.

Complement-fixing antibodies for hepatitis-associated antigen (HAA) were detected in 18 of 45 Ugandan patients (36 males and 9 females, aged 18-65 yr) with hepatocellular carcinoma and in only 4 of 122 controls. α-Fetoprotein was found in 30 of the 45 liver cancer patients, 16 of whom also had antibodies for HAA. Young patients tended to have antibodies for HAA more frequently than older patients. Among the 25 patients whose cancer was diagnosed histologically, 19 had cirrhosis which, in 13 cases was post-hepatitic or mixed, but predominantly post-hepatitic, in nature. Of the 5 cancer patients who may have had viral hepatitis, none had antibodies for HAA. These findings support the hypothesis that viral hepatitis may play a role in the etiology and pathogenesis of hepatocellular carcinoma in Uganda.

653 A CASE OF THE DUBIN-JOHNSON SYNDROME COMPLICATED BY ACUTE HEPATITIS. (E.) Varma, R. R. (Roy. Free Hosp., London), J. M. Grainger and P. J. Scheuer. *Gut* 110(10):817-821, 1970.

A case report is presented for a 21-yr-old man who developed Dubin-Johnson syndrome after an episode of jaundice whose onset occurred 2 days after tonsillectomy. The diagnosis of Dubin-Johnson syndrome was established by chronic, predominantly conjugated hyperbilirubinemia; a secondary rise in BSP in an extended test; poor radiological visualization of the biliary tract; recurrent abdominal symptoms; and the presence of typical pigment granules in liver biopsies. It could not be established whether the Dubin-Johnson syndrome was preceded by or initiated an episode of acute hepatitis which was probably viral in origin.

654 "SICCA COMPLEX" IN LIVER DISEASE. (E.) Golding, P. L. (London Hosp.), R. Bown. A. M. S. Mason and E. Taylor. *Br. Med. J.* 4(5731):340-342, 1970.

Sixty-three patients with liver disease were examined for the components of Sjögren's syndrome (keratoconjunctivitis sicca, xerostomia, and rheumatoid arthritis). "Sicca complex", or Sjögren's syndrome without arthritis, was diagnosed in 10 of 24 patients with active chronic hepatitis, in 13 of 18 patients with primary biliary cirrhosis, and in 5 of 13 with cryptogenic cirrhosis. Rheumatoid arthritis was found in 1 patient with active chronic hepatitis and in 1 with primary biliary cirrhosis. No evidence of Sjögren's syndrome was detected in any of the 8 patients with alcoholic cirrhosis (7 cases) or granulomatous liver disease of unknown etiology (1 case). The incidence of autoantibodies was slightly, but not significantly, higher among patients with sicca complex than among those without it. No significant differences were found in the levels of SGOT, serum alkaline phosphatase, bilirubin, albumin, or total globulin in patients with sicca complex and in those without it. These findings suggest that sicca complex and autoimmune liver disease may be part of a systemic disorder in which immunological mechanisms are involved in the etiology.

655 EXCESS LIPOFUSCIN ACCUMULATION IN CONSTITUTIONAL HEPATIC DYSFUNCTION (GILBERT'S SYNDROME). LIGHT AND ELECTRON MICROSCOPIC OBSERVATIONS. (E.) Barth, R. F. (U. Kansas Med. Ctr., Kansas City), P. M. Grimley, P. D. Berk, J. R. Bloomer and R. B. Howe. *Arch. Pathol.* 91(1):41-47, 1971.

Liver biopsies from 8 out of 9 patients (7 men and 2 women, aged 18-61 yr) with long histories of chronic unconjugated hyperbilirubinemia contained excess accumulations of a coarsely granular, golden brown pigment at the periphery of the liver cells, particularly in the pericanalicular region. This pigment, which was not present in biopsies from controls with no history of liver disease or congestive heart failure, was identified as lipofuchsin by its reactions with carbol fuchsin, Sudan black, Nile blue, and potassium ferricyanide-ferric chloride and by its ultrastructural characteristics. The amount of pigment present in Gilbert's disease appears to be correlated with age and duration of hyperbilirubinemia. This pigment differs histochemically from the pigment found in chronic idiopathic jaundice (Dubin-Johnson syndrome).

656 HEPATIC INTRAMITOCHONDRIAL CRYSTALLOIDS. (E.) Bhagwat, A. G. (St. Michael's Hosp., Toronto, Ontario, Canada) and R. C. Ross. *Arch. Pathol.* 91(1):70-77, 1971.

Intramitochondrial crystalloids were found in the liver cells of a 41-yr-old woman with type 1 hyperlipoproteinemia and hepatic fibrosis; a 42-yr-old woman with anicteric infectious hepatitis and acute gastroenteritis caused by Salmonella typhimurium; and a 41-yr-old woman with obesity, latent diabetes mellitus, and moderate fatty changes in the liver. Findings in these 3 cases indicate that the number of crystalloids per mitochondrion and the number of mitochondria involved are roughly proportional to the type and degree of liver damage. There were about 3 times as many crystalloids in liver cells of the patients with hepatitis and hyperlipoproteinemia as in those of the obese patient. No intramitochondrial crystalloids were found in the liver cells of 13 patients with active, subacute, and granulomatous hepatitis; steatosis; hemosiderosis; cirrhosis; or nonspecific hepatic changes or in the liver cells of 20 normal adult albino rabbits or 30 rabbits treated with a single dose of prednisolone (6.25 mg). It is concluded that the presence of these crystalloids is not completely nonspecific, but the precise nature of the injury remains unknown.

657 QUANTITATIVE MEASUREMENT OF IRON STORES WITH DIETHYLENETRIAMINE PENTA-ACETIC ACID. (E.) Barry, M. (Roy. Free Hosp., London), G. Cartei and S. Sherlock. *Gut* 11(11):891-898, 1970.

The chelating agent, diethylenetriamine penta-acetic acid (DTPA), was used to measure body storage iron in 15 patients with iron excess whose stores could be determined by venesection and in 25 controls (16 males and 9 females). The patients consisted of 10 males and 2 females, aged 27-70 yr, with idiopathic hemochromatosis; 1 40-yr-old female with hemochromatosis secondary to hereditary spherocytosis; and 1 male and 1 female, aged 60 and 57 yr, resp., both with cirrhosis and siderosis. A highly significant semi-logarithmic relation was found between the size of the body iron stores and urinary excretion of endogenous iron after i.v. injection of DTPA (16.7 mg/kg body weight). Venesection reduced iron excretion to control values in patients with idiopathic hemochromatosis. Urinary excretion of ^{59}Fe-DTPA was similarly related to the size of body stores, but this preformed chelate was excreted more rapidly than iron bound in vivo, suggesting that the process of tissue iron chelation is slower than that of chelate excretion. There was a highly significant linear relationship between DTPA-chelatable iron and mobilizable storage iron. The close approximation of the regression line to the origin indicated that the effect of DTPA exclusively reflected storage iron. Mean values for body storage iron were 392 ± 41 mg for male controls and 243 ± 32 mg for female controls.

658 ELECTRON MICROSCOPIC EFFECTS OF DIGITONIN IN NORMAL AND CHOLESTATIC RAT LIVERS. (E.) Scharnbeck, H. and F. Schaffner (Mt. Sinai Sch. Med., New York, N. Y.). *Am. J. Pathol.* 61(3):479-495, 1970.

By means of electron microscopy digitonin-cholesterol complexes were studied in liver tissue from male Sprague-Dawley rats with ligated common bile ducts and in the livers of nonoperated and sham-operated rats. Immersion in saturated digitonin following glutaraldehyde fixation produced a few spicules, particularly in centrilobular areas, in normal rat liver. Liver from rats with cholestasis of 4 days duration showed increased spicule formation, mainly in centrilobular areas where cholestasis is most pronounced. Spicules were also found in and near dilated bile canaliculi and sinusoids. No differences were found in mitochondria from experimental and control animals, either when mitochondria remained in situ or when they were isolated. This lack of mitochondrial change suggests that the content of free cholesterol remains normal there during cholestasis while increases in free cholesterol occur in the liver cells. Digitonin can serve as an electron microscope marker for accumulation of free cholesterol and presumably bile in the liver cells during cholestasis, but it does not help to elucidate the mechanism involved in this phenomenon.

659 IDIOPATHIC ACUTE FATTY LIVER OF PREGNANCY. (E.) Breen, K. J. (Roy. Prince Alfred Hosp., Camperdown, Australia), K. W. Perkins, S. P. Mistilis and R. Shearman. *Gut* 11(10):822-825, 1970.

A case report is presented for a 23-yr-old woman who developed jaundice and convulsions and became semicomatose shortly after delivering stillborn twins. Findings included hepatomegaly, hyperbilirubinemia, elevated serum alkaline phosphatase and SGOT values, moderate azotemia, severe hypoglycemia, and a very high WBC. A percutaneous liver biopsy showed features characteristic of acute fatty liver of pregnancy. Clinical improvement occurred after repeated i.v. infusions of dextrose. A liver biopsy taken 3 months later was normal and after 10 months the patient was clinically normal and had normal liver function tests.

660 ULTRASTRUCTURE OF THE LIVER IN NONCIRRHOTIC PORTAL FIBROSIS WITH PORTAL HYPERTENSION. (E.) Tandon, B. N. (All India Inst. Med. Sci., New Delhi), R. Lakshminarayanan, S. Bhargava, N. C. Nayak and S. K. Sama. *Gut* 11(11):905-910, 1970.

Electron microscope examination of liver biopsies from 9 patients with noncirrhotic portal fibrosis with portal hypertension revealed normal nuclear and intracytoplasmic components of the hepatocytes and abnormalities of the cell membrane and perisinusoidal space. These abnormalities include widening of the intercellular and Disse's spaces and fibrogenesis in the perisinusoidal space which often extends into the intercellular space. The etiology of these ultrastructural abnormalities is unknown. The large numbers of collagen bundles in the perisinusoidal area and the spaces of Disse might be the anatomical lesion related to the portal hypertension.

661 EFFECTS OF ETHANOL ON THE BIOGENESIS OF MITOCHONDRIAL MEMBRANES AND ASSOCIATED MITOCHONDRIAL FUNCTIONS. (E.) Rubin, E. (Mt. Sinai Sch. Med., New York, N. Y.), D. S. Beattie and C. S. Lieber. *Lab. Invest.* 23(6):620-627, 1970.

In vitro incorporation of ^{14}C-leucine into the proteins of liver mitochondria from normal male Sprague-Dawley rats was reduced 10-30% by 100 mM of ethanol. This is a measure of intramitochondrial protein synthesis which is restricted to the supply of certain insoluble structural proteins of the inner membrane. It was demonstrated that ethanol-induced inhibition of mitochondrial protein synthesis was not due to alcohol dehydrogenase contamination, acetaldehyde, peroxidation of ethanol by catalase, or lipid peroxidation. Preincubation of mitochondria with ethanol had no effect on mitochondrial protein synthesis nor did a single large dose of ethanol given 3 or 16 hr before mitochondria were obtained. In contrast, mitochondria from rats fed a diet for 24 days in which ethanol was given as an isocaloric replacement for carbohydrates incorporated almost 1/3 less ^{14}C-leucine. These mitochondria also exhibited depressed respiration in the presence and absence of ADP, reduced succinate dehydrogenase activity, and decreased contents of cytochromes a-a_3 and b. Mitochondrial swelling, which was reversed by addition of ATP, occurred when mitochondria were incubated in vitro with ethanol. This swelling was most pronounced when mitochondria from chronically-treated rats were subjected to high K^+ concentrations. These findings suggest that chronic ethanol treatment produces prolonged interference with mitochondrial membrane biogenesis in the liver and causes impairment of mitochondrial structure and function.

662 SIDE-TO-SIDE TRANSDUODENAL SUPERIOR MESENTERIC VEIN-INFERIOR VENA CAVA ANASTOMOSIS. (E.) Maillard, J. N. (Beaujon Hosp., Clichy, France), M. Huguier and B. Delaitre. *Ann. Surg.* 172(6):1023-1026, 1970.

A technique is described for anastomosing the superior mesenteric vein and the inferior vena cava. The continuity of the vena cava is preserved by dividing the third part of the duodenum and freeing the uncinate process of the pancreas. This technique was used successfully in 4 patients: 2 boys, aged 6 and 19 yr, with congenital stenosis of the portal vein and 2 women, aged 26 and 49 yr, with portal thrombophlebitis. Follow-ups for 1-5 yr after surgery showed that esophageal varices disappeared completely in 2 cases, portal or splenic pressure was reduced in 3 cases, and the anastomosis was radiologically patent in 3 cases. None of the patients had gastrointestinal hemorrhages and none developed lower limb edema or renal insufficiency.

663 FUNCTION OF THE LIVER AFTER ISOLATED COLD PERFUSION. (E.) Elmslie, R. G. (U. New South Wales Sch. Surg. Med., Sydney, Australia), R. C. Pirola, N. Coroneos and J. M. Ham. *Surg. Gynecol. Obstet.* 131(4):694-696, 1970.

Liver function was studied by means of BSP excretion in the bile in livers from healthy Landrace-Berkshire pigs which were cooled to 13-15C during excision and rewarmed immediately to 38C and in livers which were perfused at 13-15C for 3 hr before rewarming. Cold-perfused livers apparently functioned better than control livers. These findings suggest that this type of short-term preservation might be used if there is any doubt about when patients will undergo extracorporeal porcine liver perfusion.

664 TREATMENT OF LIVER DISEASES: SCOPE AND PROBLEMS. (Rev.) (Ger.) Renger, F. (Carl Gustav Carus Med. Acad. Clin., Dresden, Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 30(1-2):9-13, 1970.

665 SURGICAL GRAND ROUNDS. UNIVERSITY OF MISSISSIPPI MEDICAL CENTER. (E.) Anonymous. *South. Med. J.* 63(9):1021-1029, 1970.

666 ACUTE, FATAL HEPATIC FAILURE PRESENTING WITH PSYCHIATRIC SYMPTOMS. (E.) Zacharski, L. R. (U. Minnesota Mayo Grad. Sch. Med., Rochester), E. M. Litin, D. W. Mulder and J. C. Cain. *Am. J. Psychiatry* 127(3):382-386, 1970.

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671 LIVER TUMORS IN INFANTS AND CHILDREN. CLINICAL AND PATHOLOGICAL ANALYSIS OF 22 CASES. (E.) Nikaidoh, H. (Child. Mem. Hosp., Chicago, Ill.), J. Boggs and O. Swenson. *Arch. Surg.* 101(2):245-257, 1970.

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ACUTE NONVIRAL HEPATITIS AND HEPATIC INJURY

695 POSTOPERATIVE HEPATOGENIC JAUNDICE. (E.) Strasberg, S. M. (U. Toronto Dept. Surg. Pathol., Ontario, Canada) and M. D. Silver. *Surg. Gynecol. Obstet.* 132(1):81-86, 1971.

An analysis of 25 males and 14 females with no preoperative biliary tract or liver disease who developed postoperative jaundice suggests that hepatocellular injury is the most likely cause of the jaundice and that this injury probably results from hepatic anoxia. Of these 39 patients, 23 had been subjected to prolonged surgical procedures; 36 of the patients developed 83 postoperative complications, many of which were accompanied by shock. In 10 cases the patients received 6-10 units of transfused blood. This suggests that increased hemolysis from multiple blood transfusions aggravates the jaundice by delivering a large amount of bilirubin to the damaged liver. In 12 cases the serum bilirubin level was greater than 20 mg%, and in 16 of 17 patients studied more than 50% of the total bilirubin was conjugated. Elevated urinary bilirubin levels were present in 26 of 28 cases, and elevated serum alkaline phosphatase activities in 23 of 29. Autopsies, performed in 16 cases, showed no evidence of biliary tract obstruction or underlying liver disease. Histological changes in the liver differed in severity and ranged from bile-staining of the liver cells to canalicular bile plugs and necrosis of the liver parenchyma. Shock and congestive heart failure were significantly related to the severity of the jaundice.

696 ACCENTUATION OF CARBON TETRACHLORIDE-INDUCED CIRRHOSIS BY AZATHIOPRINE IN THE RAT. (E.) Reuber, M. D. (NCI, Bethesda, Md.). *Arch. Pathol.* 90(6):567-571, 1970.

Simultaneous administration of carbon tetrachloride (1.3 ml/kg of a 50% corn oil solution s.c. twice a week) and azathioprine (0.02% added to the diet) shortened the survival time and produced severe cirrhosis and cholangiofibrosis in Buffalo strain male rats. These animals also had jaundice; histological evidence of extramedullary hematopoiesis in the spleen; elevated total and conjugated serum bilirubin levels; and atrophy of the testes, seminal vesicles, and prostate, the severity of which was correlated with the severity of cirrhosis. Rats given only carbon tetrachloride developed mild cirrhosis and some of those given only azathioprine developed mild parenchymal necrosis and disturbances in the architecture of the hepatic cord.

697 INDUCTION OF FATTY LIVER IN THE RAT AFTER CYCLOHEXIMIDE ADMINISTRATION. (E.) Jazcilevich, S. (Natl. Polytech. Inst., Mexico, D.F., Mexico) and S. Villa-Treviño. *Lab. Invest.* 23(6):590-594, 1970.

Injection of cycloheximide (3.3 mg/kg i.p.) into fasted adult male Wistar rats increased liver triglyceride concentration to about twice that of controls within 12 hr, with a maximum increase occurring 4-6 hr after injection. Staining indicated diffusion of fat-positive material throughout the cells with no massive infiltration. The accumulation of triglycerides in the liver was proportional to the dose of cycloheximide; for 1.5 mg/kg, a 45% increase was seen. Incorporation of amino acid into total liver protein was drastically inhibited by the administration of cycloheximide, and reached a maximum after 2 hr. Inhibition was similar for both doses. It is concluded that fatty liver due to the accumulation of triglycerides is only partially attributable to inhibition of protein synthesis. Results are similar for administration of ethionine, but cycloheximide does not cause a separation of polysomes from the membrane. This suggests that differences in triglyceride accumulation due to administration of hepatotoxic drugs is correlated with level of protein synthesis inhibition and also with disturbances in the polysome-membrane relationship.

698 ENZYME HISTOCHEMICAL STUDIES OF THE LIVER DURING IMMUNOSUPPRESSIVE TREATMENT IN DOGS. (E.) Aronsen, K. F. (Malmo Gen. Hosp., Sweden), B. Husberg, I. Hägerstrand, J. G. Nordén and B. Pihl. *Acta Chir. Scand.* 136(6):529-536, 1970.

Enzyme determinations were run on liver biopsies and blood samples taken from beagles which were given azathioprine alone, antilymphocyte immunoglobulin G alone, or a combination of these 2 immunosuppressive agents. Dogs given azathioprine alone received twice the dose of those given both agents. Mild cholestasis developed in 1 of the 5 dogs treated with azathioprine alone, in both of the 2 dogs given antilymphocyte immunoglobulin G alone, and in 4 of the 5 dogs given both agents. The most pronounced histochemical change in the liver was increased alkaline phosphatase staining in the canaliculi of all of the experimental dogs and, to a lesser extent, in the controls. Thus, this change appears to be caused by anesthesia and surgical trauma. Pathological values for SGOT, serum alkaline phosphatase, and serum bilirubin were only found in dogs treated with large doses of azathioprine. The activity of serum γ-glutamyl transpeptidase was decreased or not detectable in all experimental animals. These results indicate that small doses of azathioprine and antilymphocyte immunoglobulin G are preferable to a large dose of azathioprine alone, but both agents cause cholestasis.

699 LACTIC ACIDOSIS AND LIVER DAMAGE. (E.) Perret, C. (U. Lausanne Med. Clin., Switzerland), S. Poli and J. F. Enrico. *Helv. Med. Acta* 35(5):377-405, 1970.

In 5 patients (4 men and 1 woman, aged 20-68 yr) with severe "idiopathic" lactic acidosis, intense hyperventilation associated with rapidly progressive acidosis was the main clinical feature. Associated diseases were 2 cases of hypertension and 1 each of pulmonary tuberculosis, cerebrovascular accident, alcoholism, and heat exhaustion. Only temporary improvement was observed after treatment with hyperbaric oxygen, alkaline salts, or methylene blue, with shock death occurring from several hr to a few days after onset of symptoms. Extensive hepatic necrosis was observed at autopsy in all 5 cases. To test the hypothesis that lactic acidosis was related to an over-production of lactate associated with a diminished liver uptake, the influence of liver damage on the effects of prolonged hyperventilation were studied in dogs. Clamping the hepatic artery, with or without a portal by-pass, transformed primary respiratory alkalosis into progressive and irreversible lactic acidosis, thus supporting this hypothesis.

700 THE LIVER IN MILD HALOTHANE HEPATITIS. LIGHT AND ELECTRON MICROSCOPIC FINDINGS WITH SPECIAL REFERENCE TO THE MONONUCLEAR CELL INFILTRATE. (E.) Uzunalimoglu, B., J. H. Yardley (Johns Hopkins Hosp., Baltimore, Md.) and J. K. Boitnott. *Am. J. Pathol.* 61(3):457-478, 1970.

Light and electron microscopic findings are reported for liver biopsies from 3 patients who developed fever, eosinophilia, and marked elevations of serum transaminase activity after halothane anesthesia. In all 3 cases light microscopy showed relatively patchy hepatitis with prominent focal necrosis, evidence of hepatocellular injury, predominantly mononuclear inflammatory infiltrates, and relatively prominent focal areas of cell "drop-out". Minimal glycogen depletion and some fatty infiltration were found in the liver cells. Electron micrographs revealed a pattern of nonspecific changes in the liver cells: the presence of light and dark cells; widening of intercellular spaces and changes in the microvilli along Disse's spaces; dilatation of the rough endoplasmic reticulum with loss of ribosomal granules; and marked changes in the mitochondria which consisted of the formation of crystalloid inclusions and derangements in the cristae and mitochondrial envelopes. Only a few of the liver cells contained lysosomes and autophagic vacuoles, and the Kupffer cells remained basically unchanged. These changes differ significantly from those found in viral hepatitis. Many of the mononuclear cells found in the inflammatory infiltrate were comparable to those observed in delayed hypersensitivity reactions.

Many of the mononuclear cells were in close contact with the liver cells and, in some cases, this was associated with changes in the external cell membranes. These findings suggest that the primary injury to the liver parenchyma in halothane hepatitis is produced by cell-mediated immunity. This does not rule out the possibility that humoral antibodies, antigen-antibody complexes, or nonimmunologic toxic injury may be involved.

701 AFLATOXIN-INDUCED HEPATIC INJURY IN THE AFRICAN MONKEY. (E.) Alpert, E. (Massachusetts Gen. Hosp., Boston), A. Serck-Hanssen and B. Rajagopolan. *Arch. Environ. Health* 20(6):723-728, 1970.

Centrilobular degeneration and necrosis were found at autopsy in 3 of 5 young male African monkeys (Cercopithecus aethiops) who had been given aflatoxin (0.01-1.0 mg/day in corn oil) p.o. through a stomach tube until they died 16-22 days later. This aflatoxin was 92% pure and contained 73% aflatoxin B_1, 24% of B_2, 2% of G_1, and 1% of G_2. In the 2 monkeys given 1.0 mg doses serum bilirubin and SGOT activities were elevated 3-4 days after aflatoxin administration was begun and percutaneous liver biopsies showed evidence of liver damage after 5 and 6 days, resp. This is the first time that toxic hepatitis, similar to that seen in man, has been induced in primates by aflatoxin.

702 RADIATION HEPATITIS IN CHILDREN. (E.) Samuels, L. D. (Child. Hosp., Columbus, Ohio), J. L. Grosfeld and M. Kartha. *J. Pediatr.* 78(1):68-73, 1971.

An 8-month-old boy with a Wilm's tumor and a 7-yr-old girl with Ewing's sarcoma developed acute radiation hepatitis after they were given 2000 rads of ^{60}Co therapy over a 2 week period. The boy first received dactinomycin therapy (0.015 mg/kg/day for 5 days i.v.). In both cases the acute stage was characterized by severe interstitial hemorrhage, hepatic and splenic congestion, portal hypertension, and ascites and was followed by hepatic fibrosis and atrophy. The boy, who developed hepatitis immediately after radiation, recovered promptly after dactinomycin therapy was discontinued and supportive treatment was begun, but he died 6 months later with multiple pulmonary metastases. The girl, who developed symptoms of acute hepatitis 4 months after radiation, died 2 months later of a cardiac arrest. These cases suggest that children's livers may be more sensitive to the effects of radiation than adults' livers.

703 RIGHT HEPATIC LOBECTOMY FOR MASSIVE LIVER TRAUMA. (E.) Naqvi, M. A. (New Waterford Consolidated Hosp., Canada), D. S. Nathanson and J. A. Roach. *Can. Med. Assoc. J.* 103(6):626-628, 1970.

704 REACTIONS OF THE LIVER TO DRUGS. (Fr.) Sherlock, S. (Roy. Free Hosp., London). *Med. Hyg. (Geneve)* 28(930):1359-1360, 1970.

705 SERUM ENZYME LEVELS AND THE BSP TEST IN VISCOSE RAYON WORKERS EXPOSED TO CARBON DISULFIDE. (Pol.) Gregorczyk, J. (Pomeranian Med. Acad. 1st Intern Dis. Clin., Szczecin, Poland) and B. Szymanska. *Med. Pracy* 21(5):435-449, 1970.

See also numbers: 708, 738

ACUTE VIRAL HEPATITIS

706 CHROMOSOMAL ABERRATIONS IN INFECTIVE HEPATITIS. (E.) Matsaniotis, N. (U. Athens Dept. Pediatr., Greece), K. Kiossoglou, F. Maounis and D. Anagnostakis. *J. Clin. Pathol.* 23(7):553-557, 1970.

Chromosomal findings were studied in the bone marrow cells of 27 children in the active phase of infectious hepatitis and during remission. Numerical chromosomal aberrations were not observed, nor was any evidence obtained that mitotic activity of bone marrow cells was suppressed in patients with infectious hepatitis. The incidence of cells with structural abnormalities was 9.6 and 11.3% resp., during the first and third weeks, and 0.7% during the sixth week, and the difference between patients and controls was statistically significant. Many of the affected cells showed more than one aberration. The distribution of chromosomal aberrations was apparently not random, since chromosomes of the A_2 and B_{4-5} series were mainly affected. Changes were found proximal to the centromere region. Chromosomal abnormalities were apparently not related to the severity of the disease or to the sex or age of the patients.

707 LIVER CELL FUNCTION IN INFECTIOUS HEPATITIS IN MAN. (E.) Schersten, T.

(Sahlgrenska Hosp., Goteborg, Sweden), P. Björntorp, S. Björkerud, S. Smeds and R. Ekholm. *Acta Hepatosplenol. (Stuttg.)* 17(6):375-392, 1970.

Various criteria of liver function were compared in liver biopsies taken from 5 patients (1 women and 4 men, aged 21-77 yr) with acute infectious hepatitis, 28 patients (9 men and 19 women, aged 20-83 yr) with obstructive jaundice, and 77 controls (26 men and 51 women, aged 19-75 yr) operated on for uncomplicated cholelithiasis or peptic ulcer. In both infectious hepatitis and obstructive jaundice mitochondrial oxygen uptake was decreased for NAD-dependent substrates and, in infectious hepatitis, for succinate. In infectious hepatitis respiratory control indices and P:O ratios indicated that oxidative phosphorylation was uncoupled. Decreased concentrations of pyridine nucleotides and low ATPase activity which was not stimulated by 2,4-dinitrophenol suggest that mitochondrial integrity is altered. In obstructive jaundice ratios between reduced and oxidized pyridine nucleotides in the mitochondria indicate that electron transport is inhibited at the flavin level before the ubiquinone crossover point. In infectious hepatitis the rate of bile acid conjugation was low in both liver homogenates and subcellular fractions, indicating interference with the activity or production of bile-conjugating enzymes. In obstructive jaundice the rate of bile acid conjugation was reduced only in liver homogenates. In contrast to obstructive jaundice, in which the ratio of total to free lysosomal acid phosphatase and cathepsin activities were reduced, all 4 lysosomal enzyme activities (acid phosphatase, aryl sulfatase, β-glucuronidase, and cathepsin) were normal in infectious hepatitis.

708 SERUM CHOLESTEROL ESTERIFYING AND CHOLESTERYL ESTER HYDROLYZING ACTIVITIES IN LIVER DISEASES: RELATIONSHIPS TO CHOLESTEROL, BILIRUBIN, AND BILE SALT CONCENTRATIONS. (E.) Jones, D. P. (U. Chicago Dept. Med., Ill.), F. R. Sosa, J. Shartsis, P. T. Shah, E. Skromak and W. T. Beher. *J. Clin. Invest.* 50(2):259-265, 1971.

Net serum cholesterol esterifying activity (CEA) was decreased in 28 patients, aged 15-56 yr, with viral hepatitis and in 25 patients, aged 30-57 yr, with chronic alcoholic liver disease. CEA was positively correlated with the percentages and concentrations of serum cholesteryl esters, and these cholesterol parameters were negatively correlated with serum bilirubin levels. However, incubation of serum with bilirubin or with sodium glycocholate, an inhibitor of lecithin-cholesterol acyl transferase (LCAT), in vitro had no effect on the CEA. Thus, the decreased net CEA was not due to its inhibition by serum bile salts. Sera from 5 patients showed gross evidence of cholesteryl ester hydrolase activity so net CEA cannot be equated with the LCAT activity. Although the relative contributions of LCAT and cholesteryl ester hydrolase activities to net CEA were not established, correlations between net CEA and the concentrations and percentages of cholesteryl esters suggest that the CEA is physiologically important in the synthesis of serum cholesteryl esters and that the decreased CEA is one mechanism for the decreased serum cholesteryl ester levels found in patients with liver disease.

709 CIRRHOSIS OF THE LIVER FOLLOWING VIRAL HEPATITIS, A TWENTY-YEAR MORTALITY FOLLOW-UP. (E.) Beebe, G. W. (Natl. Acad. Sci. Res. Counc., Washington, D. C.) and A. H. Simon. *Am. J. Epidemiol.* 92(5):279-286, 1970.

A 20-yr mortality study of 5393 out of 40,200 enlisted men hospitalized for hepatitis in World War II and 2696 controls provides no evidence of an increased risk of cirrhosis among patients with either serum hepatitis (2037 cases) or infectious hepatitis (3365 cases). Of the 21 men (12 hepatitis patients and 9 controls) whose deaths were attributed to cirrhosis, 11 had prior hospital admissions for alcoholism or a history of alcoholism; 3 deaths in hepatitis patients were service-connected. It should be noted that the subjects included in this survey were young men in a good state of nutrition and general health. No information is provided about the risk of cirrhosis among women, older men, or men in a poor state of nutrition or general health.

710 VITAMIN B_{12} AND ITS BINDING PROTEINS IN CIRRHOSIS AND INFECTIOUS HEPATITIS. (E.) Schønau Jørgensen, F. (U. Copenhagen Inst. Med. Physiol. C, Denmark). *Scand. J. Haematol.* 7(5):322-324, 1970.

By gel filtration on Sephadex G 200 the total vitamin B_{12}-binding capacity of serum and the unsaturated vitamin B_{12}-binding capacity of transcobalamines I and II were determined in 10 patients with infectious hepatitis, 9 with cirrhosis, and 5 normal controls. No differences in the total vitamin B_{12}-binding capacity were found in these 3 groups, but the unsaturated vitamin B_{12}-binding capacity was significantly reduced in sera from patients with hepatitis and cirrhosis. The binding capacities of both transcobalamine I and transcobalamine II were reduced, particularly in hepatitis. Differences between these results and others reported in the literature may be due either to the larger number of cirrhotics studied or to the use of different separation techniques. The mean serum vitamin B_{12} concentrations were significantly higher in patients with infectious hepatitis and cirrhosis than in the controls, but there were no differences between serum vitamin B_{12} levels in patients with hepatitis and in those with cirrhosis.

711 HEPATITIS-ASSOCIATED ANTIGEN AND CIRRHOSIS IN UGANDA. (E.)

Maynard, E. P., III (Massachusetts Gen. Hosp., Boston), F. Sadikali, P. P. Anthony and L. F. Barker. *Lancet* 2(7687):1326-1328, 1970.

Hepatitis-associated antigen was found in sera from 12 of 20 patients (15 males and 5 females, aged 11-50 yr) with clinical and biochemical features of acute viral hepatitis, in 15 of 49 patients (32 males and 17 females, aged 16-60 yr) with cirrhosis, and in only 3 of 143 controls. Diagnoses in positive controls were (1) diabetes mellitus and pharyngitis, (2) duodenal ulcer, and (3) tropical splenomegaly syndrome. In patients with low titers of circulating antigen the complement-fixation test was much more sensitive than agar-gel immunodiffusion. The high frequency of hepatitis-associated antigen in these patients suggests that in Uganda infection with long-incubation serum hepatitis virus may play an important role in the etiology of cirrhosis. None of these patients had histories compatible with parenteral transmission of hepatitis virus except for the possibility of an insect vector.

712 MARBURG VIRAL HEPATITIS: STUDIES IN MAN AND GUINEA PIGS. (Ger.) Bechtelsheimer, H. (U. Bonn Pathol. Inst., Germany), G. Korb and P. Gedigk. *Virchows Arch. [Pathol. Anat.]* 351(4):273-290, 1970.

Histological examination of liver tissue from 19 patients who contracted hepatitis from contact with monkeys (Cercopithecus aethiops) and from guinea pigs infected with this virus demonstrated that hepatitis induced by Marburg virus can be differentiated from other forms of hepatitis by the type and site of necrosis which it produces and by accompanying regressive and inflammatory changes. The first stage is characterized by disseminated acidophilic necrosis of single cells and hyperactivity of the Kupffer cells. Larger areas of necrosis form by eccentric and radial extension and occasional cytoplasmic inclusion bodies and numerous basophilic bodies may also be found. The rest of the liver parenchyma undergoes fatty metamorphosis, and infiltrates of monocytic and lymphocytic cells appear in the periportal regions. Necrotic areas are then absorbed and replaced by regenerating liver cells. In general, serum transaminase levels paralleled the severity of morphological changes. No fibrotic or cirrhotic changes were evident, even in cases in which liver injury was severe. No evidence of cholestasis was ever observed in any of the stages.

713 HEPATITIS. (Rev.) (E.) Russell, R. I. (Roy. Infirm., Glasgow, Scotland). *Scott. Med. J.* 15(9):331-338, 1970.

714 REVIEW OF HEPATITIS. (Rev.) (Ger.) Loescher, K. A. (Lab. Serv. Co., Eschborn/Taunus, Germany). *Krankenhausarzt* 43(9):391-394, 1970.

715 PATTERNS AND PROGNOSIS IN HEPATITIS. (E.) Schaffner, F. *N. Engl. J. Med.* 283(20):1108-1109, 1970.

716 INFECTIOUS HEPATITIS. REPORT OF AN OUTBREAK, APPARENTLY WATER BORNE, IN AN INSTITUTION. (E.) Rennie, T. F. (P.O. Box 9, Parramatta, Australia). *Med. J. Aust.* 57, Pt. 2 (3):135-136, 1970.

717 VIRAL HEPATITIS. CLINICAL AND TISSUE CULTURE STUDIES. (E.) Boggs, J. D. (Child. Mem. Hosp., Chicago, Ill.), J. L. Melnick, M. E. Conrad and B. F. Felsher. *JAMA* 214(6):1041-1046, 1970.

718 HEPATITIS IN DIALYSIS UNITS. (E.) Anonymous. *Br. Med. J.* 4(5730):255-256, 1970.

719 SERUM HEPATITIS. (Sp.) Medina Aguilar, R. (Sch. Med., Mexico City, Mexico). *Medicina (Mex.)* 50(1089):393-400, 1970.

720 AUSTRALIA(SH) ANTIGEN IN PATIENTS WITH LIVER DISEASE AND BLOOD DONORS. (Ger.) Kaboth, U. (Univ. Med. Clin., Gottingen, Germany), A. Schober and H. J. Arndt. *Dtsch. Med. Wochenschr.* 95(43):2157-2165, 1970.

721 HERPES-LIKE VIRUS (EB VIRUS) IN CONTINUOUS LYMPHOBLASTOID CELL LINES FROM PATIENTS WITH VIRAL HEPATITIS. (E.) Stevens, D. P. (NIH, Bethesda, Md.), L. F. Barker, H. E. Hopps and H. M. Meyer, Jr. *J. Immunol.* 105(4):1040-1042, 1970.

722 INDIVIDUAL THERAPY OF INFLAMMATORY LIVER DISEASES. (Rev.) (Ger.) Meyer Zu Schwabedissen, O. (Hauptstr. 45, Achern/Baden, Germany). *Med. Klin.* 65(39):1707-1708, 1970.

723 PREVENTION OF POSTTRANSFUSION HEPATITIS BY γ-GLOBULIN. PRELIMINARY REPORT. A COOPERATIVE STUDY. (E.) Grady, G. F. (State Lab. Inst., Boston, Mass.) and A. J. E. Bennett. *JAMA* 214(1):140-142, 1970.

724 BEHAVIOR OF VARIOUS NATURAL DEFENSE FACTORS IN ACUTE HEPATITIS. (It.) Ghidini, O. (Glaxo Labs. Res. Div., Verona, Italy), A. Del Campo, P. Scheda and P. F. Baratta. *Minerva Med.* 61(81):4485-4497, 1970.

725 BEHAVIOR OF VARIOUS NATURAL DEFENSE FACTORS IN ACUTE HEPATITIS. II. BLOOD PROPERDIN LEVELS IN VARIOUS STAGES OF INFECTION. (It.) Del Campo, A. (Glaxo Labs. Res. Div., Verona, Italy), O. Ghidini, P. Scheda and P. F. Baratta. *Minerva Med.* 61(81):4498-4503, 1970.

726 MONOCLONAL GAMMAGLOBULIN ANOMALY AND IgA DEFICIENCY IN ACTIVE HEPATITIS. (Ger.) Ohnhaus, E. (Univ. Med. Clin., Erlangen/Nuremberg, Germany), H. Gotz and H. J. Horstmann. *Dtsch. Med. Wochenschr.* 95(41):2062-2066, 1970.

727 GASTRIC ACID SECRETION BY HISTAMINE INTRAGASTRIC STIMULATION IN ACUTE HEPATITIS. (E.) Peralta, C. G. (Juan Fernandez Hosp., Buenos Aires, Argentina), C. M. Vaccarezza, J. M. Rivoira and H. H. Rubio. *Digestion* 3(5):257-261, 1970.

728 HYPERLIPIDEMIA AND HYPERCHOLESTEREMIA IN ACUTE VIRAL HEPATITIS IN CHILDHOOD. (Por.) Lima, J. P. (Porto Alegre Catholic Sch. Med., Brazil), T. R. da S. Montenegro, C. A. Marroni, A. B. de M. Brandao, G. L. da Silva and G. Lardi. *Arq. Gastroenterol.* 7(4):181-186, 1970.

See also numbers: 329, 388, 652, 653, 729, 731

CHRONIC HEPATITIS

729 INCIDENCE OF CHRONIC HEPATITIS AFTER EPIDEMIC OF INFECTIOUS HEPATITIS. (E.) Zaversnik, H. (Celje Gen. Hosp., Slovenia, Yugoslavia) and S. Petrovic. *Br. Med. J.* 4(5729):220, 1970.

During an outbreak of infectious hepatitis in 1966, 2778 patients (1429 males and 1349 females) were hospitalized in Celje, Slovenia. Follow-up of 255 of these patients showed that 38 (31 females and 7 males) had evidence of persistent liver damage (hepatomegaly and/or elevated thymol turbidity tests). Liver biopsies were normal in 7 cases but showed chronic persistent hepatitis in 15 cases, protracted hepatitis in 14 cases, and chronic active hepatitis in 2 cases. Patients with chronic forms of hepatitis were not clustered in any specific areas of the Celje region.

730 DISTINCTIONS IN CHRONIC ACTIVE HEPATITIS BASED ON CIRCULATING HEPATITIS-ASSOCIATED ANTIGEN. (E.) Bulkley, B. H. (Harvard Med. Sch., Boston, Mass.), S. E. Goldfinger, W. D. Heizer, K. J. Isselbacher and N. R. Shulman. *Lancet* 2(7687):1323-1326, 1970.

On the basis of serological tests for circulating hepatitis-associated antigen, antinuclear antibodies, and the lupus erythematosis (LE) cell phenomenon, 30 patients with chronic active hepatitis were divided into 3 groups: (1) 7 men with hepatitis-associated antigen, (2) 9 (5 women and 4 men) with either antinuclear antibodies or LE cells, and (3) 14 (10 women and 4 men) who had negative reactions to all 3 tests. The 7 patients in group (1), who had symptoms of chronic acute hepatitis for 1-11 yr, all had high titers of hepatitis-associated antigen for periods of 6-18 months. In 6 of the 7 cases histories were compatible with parenteral transmission of hepatitis virus and 5 had an abrupt, rather than an insidious, onset of symptoms. Arthralgia developed in 4 cases and manifest arthritis in 3 although none of these patients had positive tests for rheumatoid factor. None of the patients in group (2) had histories of parenteral exposure to hepatitis virus and the onset of the disease was insidious in 5 of 9 cases. No apparent differences between these 3 groups were noted in SGOT activities, albumin levels, or in the cephalin-flocculation test, but serum bilirubin levels tended to be lower in group (1) patients. Liver findings ranged from mild fibrosis to frank cirrhosis in all 3 groups. Cirrhosis was present in 4 out of 7 group (1) patients, in 2 out of 9 group (2) patients, and in 9 out of 14 group (3) patients. The lower percentage of cirrhosis in group (2) patients may be a reflection of the slightly younger mean age of this group.

731 AN INTERPLAY OF GENETIC AND ENVIRONMENTAL FACTORS IN FAMILIAL HEPATITIS AND MYASTHENIA GRAVIS. (E.) Whittingham, S. (Hall Inst. Med. Res., Melbourne, Victoria, Australia), I. R. Mackay and Z. S. Kiss. *Gut* 11(10):811-816, 1970.

A pedigree is presented for a family in which the 16-yr-old female proposita and her 69-yr-old great aunt had lupoid hepatitis, the 43-yr-old father of the proposita had myasthenia gravis, and the 13-yr-old brother of the proposita had chronic hepatitis. The mother and 6 other siblings of the proposita had no evidence of autoimmune disease. In 1962 the proposita, her mother, and the affected brother became ill during an epidemic of infectious hepatitis. The great-aunt, however, lived in another town and had no contact with the rest of the family. Apart from coincidence, the illnesses in this family can only be explained by a combination of genetic predisposition to chronic liver disease in particular and to autoimmune reactions in general and a "triggering" effect of infection with hepatitis virus.

732 STUDY OF THE PATHOGENESIS OF ACTIVE CHRONIC HEPATITIS. (Ger.) Kössling, F. K. (Johannes Gutenberg U. Pathol. Inst., Mainz, Germany) and K. H. Meyer Zum Buschenfelde. *Z. Gesamte Exp. Med.* 153(2):150-161, 1970.

733 TREATMENT OF CHRONIC HEPATITIS WITH IMMUNOSUPPRESSIVE DRUGS. (Ger.) Kommerell, B. (Univ. Med. Clin., Heidelberg, Germany) and M. Seeliger. *Dtsch. Med. Wochenschr.* 95(50):2521-2525, 1970.

734 PHYSIOCHEMICAL, IMMUNOCHEMICAL, AND SEROLOGICAL DATA ON COLD-PRECIPITABLE PROTEINS IN CHRONIC LIVER DISEASE. (Rum.) Fodor, O. (IMF 3rd Med. Clin., Cluj, Rumania), G. Nicoara and N. Parau. *Med. Interna (Bucur.)* 22(6):687-696, 1970.

735 CHRONIC HEPATITIS AND AUSTRALIA ANTIGEN. THERAPEUTIC TRIAL OF A SERUM CONTAINING THE CORRESPONDING ANTIBODY. (Fr.) Geffroy, Y. (Nicolle Hosp., Rouen, France), R. Colin and B. Paillot. *Ann. Gastroenterol. Hepatol. (Paris)* 6(6):465-471, 1970.

736 COMPARISON OF THE EFFECTIVENESS OF A PANCREATIC PREPARATION AND A COMBINATION OF ASPARTATE AND ACETYLMETHIONINE IN PANCREATIC DISORDERS ASSOCIATED WITH ACTIVE CHRONIC HEPATITIS. (Rum.) Cosma, V. (IMF 3rd Med. Clin., Cluj, Rumania), I. Szantay, D. Grigoras and O. Pascu. *Med. Interna (Bucur.)* 22(10):1217-1222, 1970.

See also numbers: 654, 667, 686, 713, 726, 741, 742, 744, 752

CIRRHOSIS

737 FACTORS INFLUENCING THE PROGNOSIS OF THE ALCOHOLIC PATIENT WITH CIRRHOSIS. (E.) Rankin, J. R. (U. Melbourne Dept. Med., Australia) P. Wilkinson and J. N. Santamaria. *Australas. Ann. Med.* 19(3):232-239, 1970.

Over a 4-yr period, 77 alcoholic patients (54 men, 23 women) had cirrhosis. Of these, 7 in terminal stages died without leaving the hospital, 14 were treated and could not be further traced, and the remaining 56 (40 men, 16 women) were studied over a period of 10-57 months. Cirrhosis was histologically proven in all, and the subsequent morbidity and mortality rates were associated with drinking habits, occupation, and sex. All but 1 of the 14 who completely gave up drinking alcohol were alive and symptom-free; the one death was not attributed to liver failure, but no development of an ovarian carcinoma. Of the 17 who reduced their alcoholic intake and the 25 who did not modify their consumption, 2 and 6, resp., died during the time of the study. Symptoms included jaundice, hepatic encephalopathy, ascites, or hemorrhage from esophageal varices. Of the 8 patients who continued their alcohol intake, 1 died of massive esophageal hemorrhage and 7 died from liver failure. There were 3 deaths due to other causes; all 3 were patients with recurrent hepatic failure. Differences in occupation (men were classified as either white- or blue-collar workers) for both morbidity and mortality were just less than significant. It is concluded that causation of cirrhosis is dependent upon duration of alcohol consumption and sex, whereas progression of disease after cirrhosis is dependent upon continued ethanol consumption and socioeconomic status.

738 THE EXTRAHEPATIC UPTAKE OF ^{198}Au AS AN INDEX OF PORTAL HYPERTENSION. (E.) Fernandez, J. P., R. A. O'Rourke (Univ. Hosp. San Diego County, Calif.), J. N. Cooper, G. A. Ewy and J. C. Mullen. *Am. J. Dig. Dis.* 15(10): 883-893, 1970.

Liver scans with ^{198}Au and wedged hepatic vein pressure measurements were made on 20 patients (13 men and 7 women, aged 23-58 yr) with chronic diffuse liver disease due to alcoholism (19 cases) and sarcoid (1 case). Of the 14 patients who had spleen and/or bone marrow uptake of ^{198}Au, all 14 had cirrhosis and hepatic wedge pressures of 18 mm Hg or more and 8 had esophageal varices. Of the 6 patients with no extrahepatic uptake of ^{198}Au, 2 had early portal cirrhosis, 3 had alcoholic hepatitis, and 1 had a noncaseating granuloma and focal hepatic fibrosis. None of these patients had esophageal varices and hepatic wedge pressures ranged from 5-16 mm Hg. These results demonstrate that the ^{198}Au liver scan is a safe and valuable procedure for estimating the degree of portal hypertension in patients with chronic diffuse liver disease.

739 COMPARTMENTAL ANALYSIS OF SULFOBROMOPHTHALEIN TRANSPORT IN NORMAL PATIENTS AND PATIENTS WITH HEPATIC DYSFUNCTION. (E.) Quarfordt, S. H. (VA Hosp., Durham, N. C.), H. L. Hilderman, D. Valle and E. Waddell. *Gastroenterology* 60(2):246-255, 1971.

BSP concentrations were determined in serum and urine from 10 normal controls and 16 patients with various liver diseases and in bile from 3 patients who had undergone choledochostomy for gallstones at various intervals for 2-3 hr after a single injection of BSP (5 mg/kg i.v.). Plasma decay curves were analyzed by a computer technique using a two-compartment model. The validity of this model was supported by the findings of constant fractional transport rates for different BSP doses (2.5-7.5 mg/kg) and close simulation of experimentally determined plasma and biliary concentrations by the model. Biliary secretory function was impaired in 3 patients with acute hepatic necrosis and in the 3 patients who had recently undergone surgery for gallstones. However, the kinetic parameters which were determined provided no diagnostic information to differentiate between alcoholic hepatitis, serum hepatitis, and biliary obstruction. Patients with Laennec's cirrhosis had low fractional plasma removal and relatively normal fractional biliary secretion. The low hepatic BSP uptake in cirrhotics may result from vascular shunting. The results obtained by this single BSP injection method are similar to those previously reported with continuous BSP infusion. However, in contrast to low biliary transport maxima observed in cirrhotics with the latter method, the single injection technique showed that biliary secretory function was almost normal.

740 MEASUREMENT OF IRON STORES IN CIRRHOSIS USING DIETHYLENETRIAMINE PENTA-ACETIC ACID. (E.) Barry, M. (Roy. Free Hosp., London), G. Cartei and S. Sherlock. *Gut* 11(11):899-904, 1970.

Iron stores were measured in 83 patients with chronic liver disease and in 25 controls by determining excretion of iron chelated by diethylenetriamine pentaacetic acid (DPTA). Iron chelation was normal in 14 patients with chronic cholestasis due to gallstones (2 cases), primary biliary cirrhosis (3 cases), traumatic and malignant biliary stricture (3 cases each), drug-induced cholestasis (2 cases), and Dubin-Johnson syndrome (1 case). Chelation was increased in 14 out of 26 patients with alcoholic cirrhosis, in 9 out of 28 patients with nonalcoholic cirrhosis, and in 11 out of 15 cirrhotics with end-to-side portacaval anastomoses. Increased chelatable iron was not closely correlated with stainable liver iron or with liver function disorders but was correlated with surgical or large spontaneous portal systemic shunts. In patients with portacaval anastomoses chelatable iron was not correlated with the time since operation or the total quantity of iron or blood administered throughout the clinical course. These findings support the view that alcoholic cirrhosis is potentially an iron-loading state but suggest that in the absence of an excessive iron intake the degree of accumulation is far less than in idiopathic hemochromatosis. Since all but 3 of the patients with alcoholic cirrhosis drank beer and spirits with a low iron content, increased iron stores might result from the ability of alcohol to increase iron absorption or might be secondary to liver or pancreatic damage.

741 ENCEPHALOPATHY AND PORTACAVAL ANASTOMOSIS. (E.) Kardel, T. (Gentofte Hosp., Copenhagen/Hellerup, Denmark), Y. Lund, P. Z. Olsen, V. Möllgaard and A. Gammeltoft. *Scand. J. Gastroenterol.* 5(8):681-685, 1970.

Neurological and psychological tests, electroencephalogram (EEG) tracings, and liver function tests were made on 34 patients (18 men and 16 women, aged 35-69 yr) before and after they underwent portacaval shunt operations for cirrhosis and portal hypertension. Preoperative examinations were made 3 months to 2 days before surgery, and postoperative examinations were made between 3 weeks and 6 yr after the operation. Cirrhosis was the result of alcoholism in 13 cases and of chronic hepatitis in 9; no predisposing factors were found in the remaining 12. Before surgery 23 patients had some degree of intellectual impairment which was related to age. After surgery 8 patients deteriorated and 3 improved. Postoperative deterioration was not related to age. There was no relation between the etiology of the cirrhosis and either preoperative status or postoperative deterioration. A correlation was found between EEG changes and impaired liver function but not between EEG changes and psychological impairment.

742 CLINICAL FEATURES AND PATHOLOGY OF ALCOHOLIC LIVER. CASES FROM THE ROYAL FREE HOSPITAL IN LONDON. (Ger.) Sherlock, S. (Roy. Free Hosp., London), P. W. Brunt and P. J. Scheuer. *Therapiewoche* 20(40):2386, 1970.

743 MUCOPOLYSACCHARIDE METABOLISM IN CHRONIC ALCOHOL-INDUCED LIVER DAMAGE. (Ger.) Becker, K. (U. Hamburg 1st Med. Clin., Germany). *Therapiewoche* 20(40):2357-2358, 1970.

744 COLLAGEN METABOLISM IN CHRONIC ALCOHOL-INDUCED LIVER DAMAGE. (Rev.) (Ger.) Hutterer, F. (Mt. Sinai Sch. Med., New York, N. Y.). *Therapiewoche* 20(40):2360-2369, 1970.

745 HEMODYNAMIC AND FUNCTIONAL ASPECTS IN ASSESSING ALCOHOLIC CIRRHOSIS. (Rev.) (Ger.) Preisig, R. (Inst. Clin. Pharmacol., Bern, Switzerland). *Therapiewoche* 20(40):2370, 1970.

746 SERUM ZINC LEVELS IN ALCOHOL-INDUCED LIVER DAMAGE. (Ger.) Von Zazgornik, J. (Univ. 1st Med. Clin., Vienna, Austria), H. Schnack, P. Wessely and R. Kotzaurek. *Z. Gastroenterol.* 8(6):346-350, 1970.

747 EFFECT OF SIREPAR ON EXPERIMENTAL CIRRHOSIS IN RATS. (E.) Szarvas, F. (Univ. Med. Sch., Szeged, Hungary) and F. Biliczki. *Ther. Hung.* 18(3):103-106, 1970.

748 RESULTS OF 23 PORTACAVAL SHUNTS IN CIRRHOTIC PATIENTS. (Fr.) Ribet, M., C. Gautier Benoit and P. Quandalle. *Lille Med.* 15(6):931-935, 1970.

749 RENAL FAILURE FOLLOWING PORTASYSTEMIC SHUNT IN PATIENTS WITH CIRRHOSIS OF THE LIVER. (E.) Garrett, J. C. (Presbyterian Hosp., New York, N. Y.), A. B. Voorhees, Jr. and S. C. Sommers. *Ann. Surg.* 172(2):218-225, 1970.

750 EVALUATION OF HAPTOGLOBIN PHENOTYPE 0-0 IN CIRRHOTIC AND NON-CIRRHOTIC HOSPITAL POPULATIONS. (E.) Nandi, M. (Tufts U. Med. Sch., Boston, Mass.), G. P. Lewis and H. Jick. *J. Clin. Pathol.* 23(8):695-699, 1970.

751 BUDD-CHIARI SYNDROME AS A COMPLICATION OF PAROXYSMAL NOCTURNAL HAEMOGLOBINURIA. (E.) Horler, A. R. (Roy. Victoria Infirm., Newcastle upon Tyne, England), M. T. Shaw and R. B. Thompson. *Postgrad. Med. J.* 46(540):618-622, 1970.

752 IMMUNOSUPPRESSIVE THERAPY IN HEPATIC CIRRHOSIS. (It.) Mazzoni, G. (Vittorio Emanuele III City Hosp., Rome, Italy), C. Di Martino, S. Pellegrini, A. Demofonti and A. Valli. *Chir. Gastroenterol.* 4(4):376-381, 1970.

753 THE ZIEVE SYNDROME. (Rev.) (Ger.) Thammig, R. (Dieburg Dist. Hosp., Gross Umstadt, Germany). *Z. Gastroenterol.* 8(6):339-345, 1970.

754 TERMINAL LACTIC ACIDOSIS IN SUBJECTS WITH SEVERE LIVER FAILURE. (Por.) Andrade, D. R. de (U. Sao Paulo Fac. Med., Brazil), A. A. Barone, S. Ishioka and J. C. Cunha. *Arq. Gastroenterol.* 7(4):217-226, 1970.

755 FAMILIAL LUPUS ERYTHEMATOSUS. (Ser.) Horvat, Z. (Med. Sch., Zagreb, Yugoslavia), Z. Radosevic and S. Ahmetovic. *Acta Med. Iugosl.* 24(2):143-150, 1970.

756 CLINICAL ASPECTS AND MORPHOLOGY OF FATTY LIVER. (Rus.) Bondar, Z. A., S. D. Podymoval and G. I. Burchakova. *Klin. Med. (Mosk.)* 48(8):104-112, 1970.

757 SPONTANEOUS UMBILICAL EVACUATION OF ASCITES. (Sp.) Bruguera, M. (Provincial Clin. Hosp., Barcelona, Spain), J. Rodes, J. Condomines and F. Fernandez Nogues. *Rev. Clin. Esp.* 118(3):271-274, 1970.

758 CATHETERIZATION OF THE UMBILICAL VEIN IN LIVER DISEASE. (Sp.) Beker, S. (Univ. Hosp., Caracas, Venezuela), R. Baquero Gonzalez and J. Valencia Parparcen. *G.E.N. (Caracas)* 24(3):299-310, 1970.

759 SPONTANEOUS RUPTURE OF A MESENTERIC VARIX IN PORTAL HYPERTENSION. (E.) Sher, M. H. (Boston U. Med. Sch., Mass.). *Hum. Pathol.* 1(1):167-169, 1970.

See also numbers: 271, 272, 302, 395, 481, 652, 654, 657, 667, 674, 709, 710, 711, 713, 720, 734, 812

760 THE CONTENT OF LIPOFUSCIN IN LIVER BIOPSIES FROM PATIENTS OPERATED FOR GALLSTONES. (E.) Braendstrup, O. (Municipal Hosp. Pathol. Anat. Inst., Copenhagen, Denmark) and P. Dombernovsky. *Acta Pathol. Microbiol. Scand.* [*A*] 78A(5):565-570, 1970.

Semi-quantitative determinations were made of the lipofuchsin content of duplicate liver biopsies from 196 patients (166 women and 30 men, aged 22-92 yr) who were operated on for gallstones. No differences were found in the amount of lipofuchsin in duplicate biopsies from the same patient. Only 3 biopsies contained no lipofuchsin. Statistical analysis with the χ^2-test showed the quantity of this pigment was significantly greater among both male and female patients over 60 yr old than among those under 60 yr old. The content of lipofuchsin was greater in biopsies from 96 patients with histologically normal liver tissue and normal serum alkaline phosphatase values than in biopsies from the group as a whole or from those with abnormal liver function and histological abnormalities (portal fibrosis and fatty infiltration).

761 RELATIONSHIP OF BILIARY PHOSPHOLIPID AND CHOLESTEROL CONCENTRATIONS TO THE OCCURRENCE AND DISSOLUTION OF HUMAN GALLSTONES. (E.) Tompkins, R. K. (U. California Sch. Med., Los Angeles), L. G. Burke, R. M. Zollinger and D. G. Cornwell. *Ann. Surg.* 172(6):936-945, 1970.

Clinical evidence suggests that the biochemical events resulting in human gallstone formation may be prevented or even reversed by feeding lecithin and a low-fat diet. Human gallstones of the cholesterol or mixed types dissolved when implanted in the gallbladders of 7 dogs. The phospholipid concentrations in the dogs' bile remained the same, but cholesterol concentrations were significantly increased 70-107 days after implantation of the gallstones. Gallbladder bile from patients with gallstones contained only one-third the phospholipids found in bile from normal controls; cholesterol and bile salt concentrations were the same in both groups. Thin-layer chromatography of bile from dogs, normal controls, and patients with gallstones showed no qualitative differences in phospholipid concentration; lecithin was the most common phospholipid in all specimens. In hepatic bile from patients after cholecystectomy the phospholipid:cholesterol ratio remained unchanged with a control diet but increased significantly with a low-fat diet supplemented with lecithin (2.5 g 4 times a day).

762 EPIDEMIOLOGICAL CONSIDERATIONS OF CANCER OF THE GALLBLADDER, BILE DUCTS AND SALIVARY GLANDS IN THE RUBBER INDUSTRY. (E.) Mancuso, T. F. (U. Pittsburgh Grad. Sch. Public Health, Pa.) and M. J. Brennan. *J. Occup. Med.* 12(9):333-341, 1970.

Frequency of cancer of the gallbladder and bile ducts occurring in 1,568 white males employed in the manufacture of rubber automobile tires was studied from 1964-1968, an extension of a former study through mid-1964. Among 99 deaths from all causes and among 21 deaths due to malignancy, 2 patients died from cancer of the gallbladder (confirmed by autopsy and by biopsy at surgery, resp.). The 2 patients were employed for 31 yr and 22 yr, and died at ages 73 and 71, resp. Combined carcinoma of the ampulla of Vater and of the gallbladder in this group accounted for 4 of a total of 526 deaths, 4 of 107 malignancies, and 2 of 109 autopsies. Statistical analysis of the deaths which occurred among rubber workers in 6 other plants indicated a consistently higher incidence of cancer of the gallbladder, bile ducts, and salivary glands than would be expected from analysis of the ratio of number of cases to total number of deaths, number of various cancers, and number of autopsies.

763 FACTORS INFLUENCING MORBIDITY IN BILIARY TRACT OPERATIONS. (E.) Haff, R. C. (Washington U. Sch. Med., St. Louis, Mo.), H. R. Butcher, Jr. and W. F. Ballinger. *Surg. Gynecol. Obstet.* 132(2):195-203, 1971.

Factors (old age, associated diseases like diabetes mellitus, operation for persisting symptoms of acute inflammation, common duct exploration, significant leukocytosis, and histologic evidence of acute inflammation) influencing morbidity were investigated in 1000 biliary tract operations. A combination of associated illnesses, significant leukocytosis, and histologically evident acute inflammation were all associated with high morbidity rates. Similarly, those patients who were operated upon after biliary colic and also had acute inflammation, frequently had complications. However, patients operated upon shortly after symptoms of cholecystitis developed did not have an increased morbidity rate if the gallbladder was not acutely inflammed histologically. Morbidity rates were not increased by old age, arteriosclerosis, diabetes mellitus, and the time of operation in the absence of acute inflammation.

764 HISTOLOGICAL CHANGES IN LIVER BIOPSIES FROM PATIENTS WITH SURGICAL BILE DUCT DISORDERS. (E.) Poulsen, H. (Municipal Hosp. Path. Anat. Inst., Copenhagen, Denmark) and P. Christoffersen. *Acta Pathol. Microbiol. Scand.* [*A*] 78A(5):571-579, 1970.

Histological studies were made of 113 liver biopsies taken at surgery from (1) 39 patients with cholestasis and verified obstruction of the extrahepatic bile ducts, (2) 33 patients with verified obstruction of the extrahepatic bile ducts but no histological evidence of cholestasis, (3) 9 patients with verified cholecystolithiasis and cholestasis but no abnormalities of the common bile duct, and (4) 32 patients with verified cholecystolithiasis but with no cholestasis or abnormalities of the common duct. Marginal bile duct proliferation was found in all biopsies in groups (1) and (2), in 4 of the 9 in group (3), and in 22 of the 32 in group (4). Portal edema, fibrosis, and granulocyte infiltration occurred with greater frequency in group (1) than in the other groups; these abnormalities were found with equal frequency in groups (2), (3), and (4). These findings suggest that marginal bile duct proliferation results from increases in pressure and that portal edema and granulocyte infiltration are secondary to marginal bile duct proliferation.

765 CORTISOL METABOLISM IN TOTAL EXTRAHEPATIC BILIARY OBSTRUCTION. (E.) Zumoff, B. (Montefiore Hosp. Med. Ctr., Bronx, N. Y.), H. L. Bradlow, T. F. Gallagher and L. Hellman. *J. Clin. Endocrinol. Metab.* 32(1):36-41, 1971.

Cortisol metabolism was investigated in 3 patients with total extrahepatic biliary obstruction, 2 cirrhotics, and 2 noncirrhotics by i.v. administration of ^{14}C-cortisol. In biliary obstruction cortisol production was elevated and glucosiduronate formation was decreased to levels similar to those of cirrhotics. The ratio of 20α-cortolone to tetrahydrocortisone was increased to 3 times normal, an abnormality heretofore observed only in cirrhosis. Certain differences between the metabolite pattern of cirrhotics and that of patients with biliary obstruction (e.g., more tetrahydrocortisol and less cortolone in biliary obstruction) appear to be due to increased cortisol production in biliary obstruction, since administration of ACTH to cirrhotics changed their cortisol metabolite pattern so as to eliminate most of the differences between the 2 groups. These findings suggest that abnormal cortisol metabolism in cirrhosis may be due to cholestasis.

766 INTESTINAL ABSORPTION OF MICELLAR LIPID IN NORMAL AND BILE DEFICIENT RATS. (E.) Rampone, A. J. (U. Oregon Med. Sch., Portland). *Proc. Soc. Exp. Biol. Med.* 135(3):666-670, 1970.

Investigations of intestinal absorption of a micellar solution of bile salt, glyceryl monooleate, and ^{14}C-oleic acid in male Sprague-Dawley rats showed that intact controls produced chylomicrons from micelles, but chylomicron production or transport was impaired in rats with fistulas of the common bile duct although the bile salt concentration in the intestine was above the critical micellar concentration. The small intestines of intact rats and those with bile fistulas were perfused for 4 hr with the micellar solution followed by rapid washout and steady perfusion with saline for 4 hr more. Lipid determinations made on lymph from the thoracic lymph duct, pooled ileal effluents, and homogenates of the entire small intestine showed that: (1) endogenous lymph lipid increased in proportion to total lipid in both intact rats and those with bile fistulas, (2) lymph lipid reached maximum concentrations 2.7-7.0 times those of the micellar solution after 3-6 hr in controls, and (3) both groups of rats absorbed about the same amounts of micellar lipid, but the group with bile fistulas retained a significantly higher proportion of lipid in the intestinal wall after 8 hr and transported a significantly lower proportion into the lymph.

767 PRIMARY LYMPHOEDEMA COMBINED WITH HEREDITARY RECURRENT INTRAHEPATIC CHOLESTASIS. (E.) Sigstad, H. (Ringerike Hosp., Honefoss, Norway), Ø. Aagenaes, R. W. Bjørn-Hansen and K. Rootwelt. *Acta Med. Scand.* 188(3):213-219, 1970.

Primary lymphedema was reported in 5 related patients (3 women and 2 men, aged 18-34 yr) who also exhibited symptoms of recurrent intrahepatic cholestasis due to defective excretion of conjugated bilirubin, bile salts, and lipids. Symptoms included malabsorption, jaundice and pruritis. From childhood, edema of the extremities, especially the legs, was present in conjunction with itching, enamel defects, and discoloration of the teeth. Needle biopsy of 4 of the patients (during cholestasis in 2, during non-icteric periods in 2) gave almost identical results for all patients. There was some degeneration of the parenchyma with evidence of binucleated, multinucleated, or giant cells. Prominent Kupffer cells had increased amounts of yellow-brown bile pigment. Lymphangiography revealed similar changes of the lymphatics in affected members of the family, particularly in the lower extremities of 3 patients. Disturbed lymph flow in 1 patient was indicated by lymphography with colloidal ^{198}Au. As severe chronic liver damage was not seen after such recurrent epidodes of obstructed biliary drainage and resultant jaundice, the disturbed lymph flow of the liver is considered to be an etiological factor in recurrent cholestasis.

768 DIETARY FIBRE AND THE PRURITUS OF CHOLESTATIC JAUNDICE. (E.) Eastwood, M. A. (Roy. Infirm., Edinburgh, Scotland), S. L. Mowbray, R. P. H. Thompson and R. Williams. *Br. J. Nutr.* 24(4):1029-1032, 1970.

Double reversal experiments were performed on 4 women, aged 44-73 yr, with cholestatic jaundice and pruritis by giving them diets containing either normal or large amounts of lignin fiber. No improvement occurred in the pruritis or in serum bile acid levels, and no correlation was found between liver function tests and the fiber content of the diet. The concentrations of cholic acid ranged from normal to 11 times normal, those of chenodeoxycholic acid ranged up to 5 times normal values, but those of deoxycholic acid rarely exceeded normal levels. No correlation was found between serum bile acid levels and the severity of the pruritis. The failure of lignin, which strongly adsorbs bile acids *in vitro*, to reduce serum bile acid levels may be due to insufficient doses, to changes in the intraluminal pH or, less likely, to low bile acid concentrations in the intestine.

769 STUDIES ON CALCULUS *VERSUS* MILIEU: GALLSTONE AND BILE. (E.) Nakayama, F. (Kyushu U. Fac. Med., Fukuoka, Japan). *J. Lab. Clin. Med.* 77(3):366-377, 1971.

Quantitative analysis of the constituents of bile and gallstones from 10 patients showed that the cholesterol content in cholesterol stones was as much as 47 times higher than in the bile, but very little bile acids and phospholipids were present in the stones. In bile acid-calcium stones the bilirubin and calcium contents were 8 and 21 times higher, resp., than in bile, while the cholesterol content was only twice as high and the content of other constituents was considerably lower. The minimum time necessary for accumulation of cholesterol in 20 patients with cholelithiasis was calculated to range from 0.2-25 days (mean 4.7 ± 5.9 days). The chemical composition of multiple stones, found in 2 cases, did not differ appreciably. One unusual 4-layered stone had a core of cholesterol, 2 middle layers of bile pigment and calcium, and an outer layer of cholesterol. Another patient had 5 large 5-layered stones and 974 small 2-layered ones. The outer 2 layers of the large stone corresponded in appearance and composition to the 2 layers of the small stones, suggesting that 2 generations of stones were present.

770 EXPERIMENTAL CONTRIBUTION TO THE PATHOGENESIS OF STENOSIS OF ODDI'S SPHINCTER. (Ger.) Kántor, E. (Univ. 2nd Surg. Clin., Budapest, Hungary), E. Mester, G. Gyenes and B. Szende. *Z. Exp. Chir.* 3(5):332-337, 1970.

Residual pressure in the common bile duct of 5 rabbits given 3 mg/kg of morphine hydrochloride i.m. daily for 3 months were higher than in controls given injections of physiological saline. Histological examination of the papilla of Vater showed that morphine-treated animals had marked muscular hypertrophy in the sphincter and, in some cases, almost complete closure of the lumen due to proliferation of the glandular mucosa. These changes were present even 3 months after morphine treatment had been discontinued in 5 other experimental rabbits. Scars were present in the deeper layers of the mucosa in all cases, and residual pressure in the common bile duct was still higher than in controls. Since most animals had round-cell infiltrates in the superficial mucosa, it is concluded that scarring results from chronic inflammation. The glandular hyperplasia might also be a consequence of chronic tissue inflammation. These findings indicate that morphine, administered over a long period, produces spasms in Oddi's sphincter. This functional disturbance then produces organic changes which are irreversible.

771 INTRAHEPATIC BILIODIGESTIVE ANASTOMOSES IN DOGS. (E.) de Boer, J. (U. Guelph Dept. Biomed. Sci., Ontario, Canada), H. G. Downie and J. Archibald. *Surgery* 68(4):646-650, 1970.

A surgical technique was developed in which half of the left anterior lobe of the liver was resected with the aid of the "finger fracture" technique, the liver vessels and intrahepatic bile ducts were stripped and clamped as far distally as possible, and the ducts were implanted in the jejunum after pulling them through perforations in the jejunal wall. A functioning anastomosis was obtained in 4 of 8 dogs for periods ranging from 1-6 weeks. In dogs with patent ducts, moderate dilatation, partial obstruction of the bile flow, and slight to moderate cholangitis were found at autopsy. Obstruction of the implanted bile ducts was due to scar tissue formation. One dog died of a mesenteric infarction. If the patency of the bile ducts can be promoted by combating the complications or more ducts can be implanted, this technique might be useful in re-establishing bile flow in patients with inoperable obstructions of the extrahepatic bile ducts.

772 INFLUENCE OF COMMON BILE DUCT LIGATION ON HEPATIC BLOOD FLOW. (E.) Sakoda, K. (U. Louisville Sch. Med., Ky.) and M. Atik. *Am. Surg.* 36(12):731-736, 1970.

Hepatic venous blood flow was measured in mongrel dogs before and after (1) ligation of the common bile duct (21 cases), (2) sham operation (18 cases), and (3) ligation of the common bile duct followed, after 1 week, by biliary decompression (5 cases). All dogs in group (3), 5 in group (1), and 4 in group (2) were subjected to bleedin (20 ml/kg body weight) and, 1 hr later, retransfusion. Hepatic blood flow and cardiac output decreased significantly in group (1) animals within 1 hr after ligation; these changes were not accompanied by significant changes in blood pressure and blood volume. No significant changes occurred in any of these parameters in sham-operated animals. While hepatic blood flow and cardiac output decreased further in group (1) and group (2) animals after bleeding, sham-operated dogs had significantly better recoveries after retransfusion than group (1) dogs. Hepatic blood flow in group (3) animals did not differ significantly from that in sham-operated animals. However, the blood flow fell after biliary decompression and decreased still further after hemorrhagic shock. These findings suggest that obstruction of the common bile duct impairs intrahepatic blood flow. With superimposition of even mild hemorrhagic shock, hepatic blood flow may be critically reduced and cause tissue necrosis and death.

773 LONG-TERM FOLLOW-UP STUDY OF PATIENTS WITH CONGENITAL CYSTIC DILATATION OF THE COMMON BILE DUCT. (E.) Trout, H. H., III (U. California Sch. Med., Los Angeles) and W. P. ongmire, Jr. *Am. J. Surg.* 121(1):68-86, 1971.

ase reports are presented for 7 females, aged .75-46 yr, with congenital dilatation of the ommon bile duct caused by choledochal cysts. his was corrected by a Roux-en-Y choledochocy-tojejunostomy in 5 cases and a Roux-en-Y hepatico-ejunostomy in 1 case; gallbladders were also emoved in 3 cases. Choledochocystoduodenostomies, reviously performed in 2 cases, had to be evised because of complications. One patient, ho had been subjected to cholecystectomy, removal f stones in the cyst, and insertion of a long T-ube through the ampulla of Vater into the uodenum, had persistent nausea and vomiting ven after the T-tube was removed. However, she as not given further surgical treatment because f her unimpaired liver function and apparently dequate bile drainage. The other patients mproved or became asymptomatic for periods of 7 onths to 7 yr after surgery. An extensive eview is presented of all known patients with ongenital cystic dilatation of the common bile uct with 5-yr follow-up data and of postoperative omplications developing during a follow-up of ess than 5 yr.

74 THE SURGICAL SIGNIFICANCE OF SIX ANOMALIES OF THE BILIARY DUCT SYSTEM. E.) Moosman, D. A. (U. Michigan Med. Ctr., Ann rbor). *Surg. Gynecol. Obstet.* 131(4):655-660, 970.

autopsies 6 biliary tract anomalies were found ich might cause difficulties in cholecystectomy. ese are: (1) absence of the cystic duct, (2) a rge accessory bile duct emerging from the right be of the liver which was obscured by the right patic artery, (3) low junction of the hepatic cts, (4) long parallel cystic and common patic ducts with a short intrapancreatic common le duct, (5) diverticulum of the gallbladder, d (6) congenital absence of the common hepatic ct.

5 THE ULTRASTRUCTURE OF THE STRAWBERRY GALLBLADDER. (Ger.) Höra, F. and H. hulz (City Hosp. Pathol. Inst., Osnabruck, rmany). *Beitr. Pathol. Anat.* 141(3):195-212, 70.

In addition to many normal cell constituents, electron micrographs of the mucosa from 4 strawberry gallbladders revealed that epithelial cells contained 2 unusual ones: large osmiophilic bodies similar to the "stippled granules" in normal human gallbladder epithelium and large bright vacuoles in the cytoplasm. Because of their location in the apical region of the cell, the osmiophilic granules may be related to secretory processes. Their intense staining indicates that they are proteins, probably glycoproteins, which are the chief constituent of mucus. However, it is also possible that these osmiophilic granules might be end-products of lysosomal degradation. Since they contain lipids, probably cholesterol or cholesterol esters, light vacuoles are connected with absorption. The fact that cells which contain many vacuoles have few or no osmiophilic granules and vice versa provides further evidence that these 2 structures perform different functions. Light, flocculent material, which was never surrounded by membranes, was found in the dilated intercellular spaces. This material has probably been expelled from the vacuoles into intercellular spaces by reverse pinocytosis. Lipid-containing foam cells, found in the stroma of strawberry gallbladder mucosa, never had cytoplasmic myofilaments so that they do not appear to originate from smooth muscle cells. Since they were usually found among connective tissue cells, it is much more likely that foam cells originate from connective tissue cells which, from their appearance, seem to be histiocytes.

776 GALLBLADDER DISEASE IN PIMA INDIANS. DEMONSTRATION OF HIGH PREVALENCE AND EARLY ONSET BY CHOLECYSTOGRAPHY. (E.) Sampliner, R. E., P. H. Bennett (4747 N. 16th St., Phoenix, Ariz.), L. J. Comess, F. A. Rose and T. A. Burch. *N. Engl. J. Med.* 283(25):1358-1364, 1970.

By means of the clinical history and cholecystography a diagnosis of gallbladder disease was established in 48.6% of an age-sex-stratified random sample of 596 Pima Indians (296 males and 300 females, aged 15 yr and over). The prevalence of gallbladder disease was significantly higher in females, reaching a maximum of 73% among those aged 25-34 yr. In males the prevalence increased significantly after age 44 yr and reached 60% in those aged 55-64 yr. No association was demonstrated between gallbladder disease and obesity, serum cholesterol level, diabetes mellitus, or parity. These findings and other literature data suggest that the unusually high prevalence of gallbladder disease in American Indians from culturally distinct tribes may be due to genetic factors.

777 Yersinia enterocolitica INFECTION AS A POSSIBLE CAUSE OF GALLBLADDER AND PANCREATIC DISEASE. (E.) Pettersson, T. (Univ. Cent. Hosp., Helsinki, Finland) and R. Gordin. *Ann. Clin. Res.* 2(2):157-160, 1970.

Antibody titers for Yersinia enterocolitica types 3 and 9 were determined on 153 patients with acute abdominal symptoms. These determinations were made at the onset of symptoms, 10-14 days later, and after another 2-6 weeks. In 14 of these patients titers were 1:80 or higher, which is usually indicative of current or recent infection. In 8 cases the antibody titer increased significantly or was 1:320 or higher initially; this suggests that Yersinia enterocolitica is the causative agent. Of these 8 patients, 2 had acute cholecystitis and cholelithiasis; 3 had acute pancreatitis associated, in 2 cases, with biliary disease and, in 1 case, with alcohol abuse; 2 had acute abdominal pain; and 1 had a fever of unknown origin. Since the antibody titers did not change, no conclusions could be drawn about the relationship between acute infection and antibody titers in 6 patients with initial titers of 1:80. Fecal cultures for Yersinia enterocolitica were negative in all 7 patients on whom they were performed; these patients had all received antibiotics. These findings suggest that Yersinia infections may be involved in acute abdominal disease, particularly in pancreatic and biliary diseases.

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See also numbers: 273, 274, 323, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 341, 342, 414, 485, 541, 612, 626, 643, 707, 739, 740

825 A CASE OF THE ZOLLINGER-ELLISON SYNDROME ASSOCIATED WITH HYPERPLASIA OF SALIVARY AND BRUNNER'S GLANDS. (E.) Jones, B. S. (Queen Elizabeth II Hosp., Welwyn Garden City, England), J. J. O'Hagan, D. N. Phear and E. Sheville. *Gut* 11(10):837-839, 1970.

The first reported case of Zollinger-Ellison syndrome associated with hyperplasia of the salivary and duodenal glands is presented. A 41-yr-old man had a 10-month history of watery diarrhea and a 3-month history of painless symmetrical enlargement of the parotid and, to a lesser extent, the submandibular glands; epigastric pain and heartburn; and the vomiting of acid fluid in the morning. Salivation was persistent and excessive, continued day and night, and was not particularly increased by meals. Laparotomy showed a non-β islet cell carcinoma in the tail of the pancreas with many liver metastases. After surgery the diarrhea responded to prednisone therapy. Radiotherapy to the left parotid controlled excessive salivation, but the patient developed diabetes requiring insulin therapy. During an exacerbation of the diarrhea and vomiting the patient died just 3 yr after the onset of symptoms. In addition to the findings at laparotomy, autopsy showed gross hyperplasia of the duodenal glands. The secretion from these glands may have helped to prevent peptic ulceration. The diabetes was probably not caused by the pancreatic tumor, which was not too extensive, but may have resulted from corticosteroid therapy and extensive liver metastases.

826 INTERACTION OF X-RADIATION AND MALNUTRITION. A STUDY OF KINETICS OF CELLULAR PROLIFERATION IN THE JEJUNUM OF PROTEIN-DEFICIENT RATS. (E.) Verma, K. (All-India Inst. Med. Sci., New Delhi), U. Sharma and V. Ramalingaswami. *Am. J. Pathol.* 61(3):341-358, 1970.

The kinetics of cell proliferation were studied in the jejunal crypt cells of protein-deficient inbred male albino rats exposed to 200 r of whole-body X-radiation. Controls were rats fed on an isocaloric high-protein diet and weight controls fed a stock diet. At 40 min after irradiation, significant decreases occurred in the mean number of mitoses per square mm of crypt surface in all 3 groups, but this decrease was significantly less pronounced among protein-deficient rats than among the 2 control groups. The combined use of X-radiation and colchicine (0.1 mg/100g i.p.) produced no differences in the concentration of mitoses between protein-deficient and control animals, indicating that the higher concentration of mitoses in protein-deficient animals is not due to an incomplete block in the transfer of cells from the G2 to the M phase. The duration of the mitotic phase was 70 min in the protein-deficient rats, 1.5 times longer than that observed in either control group. By 2 hr after irradiation the mean concentration of mitoses in the jejunal crypts was significantly higher in controls than in protein-deficient rats. At this time necrotic and degenerative changes associated with inflammatory response were seen in the crypts of controls but not in those of protein-deficient rats. After 6 hr the concentration of mitoses in protein-deficient rats had increased significantly but had not yet reached levels in the controls. No differences were found in the ^{3}H-thymidine labeling index in the crypt cells of controls and in those of protein-deficient rats 4 hr after whole-body X-irradiation.

827 PARENTERAL AND ORAL ALIMENTATION IN THE TREATMENT OF THE NONSPECIFIC PROTRACTED DIARRHEAL SYNDROME OF INFANCY. (E.) Hyman, C. J. (67th Tactical Hosp., Mountain Home Air Force Base, Idaho), J. Reiter, J. Rodnan and A. L. Drash. *J. Pediatr.* 78(1):17-29, 1971.

A report is presented for 10 infants (6 girls and 4 boys) who developed intractable diarrhea at age 3-32 days. Of the first 7 who died, 3 had nonspecific inflammatory and proliferative changes of the small and large intestines, 3 had diffuse inflammatory ulcerative enterocolitis, and 1 had nonspecific chronic enterocolitis with minimal focal villous atrophy at autopsy. The remaining 3 patients responded to i.v. infusions of hypertonic solutions containing protein hydrolyzate, dextrose, and alcohol and oral feedings of medium-chain triglycerides. By this means the patients were given up to 400 calories/kg/day. The infants grew and developed while on this regimen and tolerated it for periods of up to 18 weeks without any serious problems. No specific cause for the diarrhea could be demonstrated although 1 infant had pathogenic *Escherichia coli* 0127-B8 on stool culture; this pathogen disappeared from the stools after oral colistin therapy. All 3 infants had hyperchloremic acidosis, positive screening tests for disaccharide malabsorption, hypochromic anemia, and hypoproteinemia with secondary hypoimmunoglobulinemia. After recovery all 3 had adverse reactions associated with a change from protein hydrolyzate to infant formula or whole milk feedings which suggests that a milk protein allergy may be involved in the etiology of nonspecific protracted diarrheal syndrome of infancy.

828 INTESTINAL ENTEROKINASE DEFICIENCY. A NEWLY-RECOGNIZED DISORDER OF PROTEIN DIGESTION. (E.) Tarlow, M. J. (Inst. Child Health, London), B. Hadorn, M. W. Arthurton and J. K. Lloyd. *Arch. Dis. Child.* 45(243):651-655, 1970.

In 2 children, who from birth had diarrhea and a minimal growth rate, intestinal enterokinase deficiency was determined by analysis of duodenal juice and the intestinal mucosa for the presence of trypsin or chymotrypsin. Normal pancreatic function was confirmed by the presence of normal lipase and amylase activities. Steatorrhea in early life is attributed to enzyme deficiencies and general protein malnutrition. The structure of the intestinal mucosa was shown to be normal by light and electron microscopic and histochemical studies in both patients. Therapeutic administration of intestinal juice from a patient with exocrine pancreatic insufficiency (containing enterokinase, but no trypsin) activated trypsinogen, and normal levels of trypsin and chymotrypsin were produced. Treatment diminished symptoms and growth accelerated. Children with trypsinogen deficiency disease should also be investigated for evidence of enterokinase deficiency, as clinical and laboratory findings are similar for both conditions.

829 LIPIDS OF THE INTESTINAL MUCOSA OF NORMAL AND ESSENTIAL FATTY ACID DEFICIENT RATS. (E.) Yurkowski, M. (Fisheries Res. Board Freshwater Inst., Winnipeg, Manitoba, Canada) and B. L. Walker. *Can. J. Physiol. Pharmacol.* 48(9):631-639, 1970.

Administration of a normal diet containing 10% corn oil or a diet containing 10% essential fatty acid (EFA)-deficient hydrogenated coconut oil to male weanling Wistar rats was followed by isolation of lipids from sections of the proximal, middle, and distal small intestine exclusive of the duodenum. Column and thin-layer chromatography were used to determine cholesterol, triglycerides (TG), free fatty acids, phosphatidylcholine, and phosphatidylethanolamine. TG and free fatty acid concentrations were greater in rats fed corn oil; the TG decreased and free fatty acids increased toward the distal end of the intestine. In EFA-deficient rats, the intestinal mucosa showed lowered levels of linoleic and arachidonic acids, and high levels of oleic, palmitoleic, and eicosatrienoic acids. While mono- and dienoic fatty acids decreased in concentration toward the distal end of the intestine, polyunsaturated acids and some saturated acids were lowest in the proximal end. It is suggested that the differences in the activities of enzymes which help synthesize polyunsaturated acids represent the controlling mechanism in the pattern of concentration of the various acids in the different intestinal segments. Clinically, EFA-deficient rats on the coconut oil diet exhibited typical symptoms such as scaliness of their tails, coarse hair, decreased weight gain, and a slightly greater yield of intestinal mucosa.

830 INTESTINAL MUCOSAL UPTAKE OF IRON AND IRON RETENTION IN IDIOPATHIC HAEMOCHROMATOSIS AS EVIDENCE FOR A MUCOSAL ABNORMALITY. (E.) Powell, L. W. (U. Queensland Roy. Brisbane Hosp., Australia), C. B. Campbell and E. Wilson. *Gut* 11(9):727-731, 1970.

An investigation of iron absorption was made in 23 patients with idiopathic hemochromatosis, 8 with iron-deficiency anemia, and in 20 normal controls. Intestinal iron uptake was measured by giving ^{59}Fe-ferric citrate during a standard meal together with a non-absorbable marker, ^{51}Cr-chromic chloride. Iron still retained by the body after 14 days was measured by whole body counting, and discriminant analysis was used to separate the 2 isotopes. The mucosal transport index of iron was determined by calculating the fraction of the initial mucosal uptake retained by the body. Both mucosal iron uptake and body iron absorption were increased in patients with iron-deficiency anemia and in 8 patients with idiopathic hemochromatosis during venesection therapy. The mucosal transport index in all these subjects approached 1.0. In 8 hemochromatosis patients studied before venesection therapy the mucosal iron uptake was within normal limits, but body iron absorption was increased in 5 and the mean mucosal transport index of iron was significantly increased.

831 ACTIVATED CHARCOAL AS A GASTROINTESTINAL DECONTAMINANT: EXPERIENCES WITH EXPERIMENTAL ANIMALS AND HUMAN SUBJECTS. (E.) Decker, W. J. (William Beaumont Gen. Hosp., El Paso, Tex.) and D. G. Corby. *Clin. Toxicol.* 3(1):1-4, 1970.

Effective methods for treating acute poisoning were studied in vitro and in rats, dogs, and humans. Activated charcoal was an effective complexing agent for many drugs and household poisons. Administration of activated charcoal p.o. caused consistent and significant inhibition of salicylate, barbiturate, and glutethimide absorption. In man, the inhibitory effect of activated charcoal was enhanced by apomorphine-induced emesis. Thus, activated charcoal can be a valuable adjunct in treating the initial phases of acute poison ingestion.

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842 THE SURGICAL MANAGEMENT OF SIALORRHEA. (E.) Goode, R. L. (Palo Alto, Calif.) nd R. A. Smith. *Laryngoscope* 80(7):1078-1089, 970.

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FEBRUARY 1971
VOLUME 6, NO. 2
901—1800

Volume 6, No. 2

Abstracts and Citations Nos. 901-1800

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the

National Institute of Arthritis and Metabolic Diseases

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ar.	Arabic
Bul.	Bulgarian
Ch.	Chinese
Cz.	Czech
Dan.	Danish
Dut.	Dutch
E.	English
Eston.	Estonian
Fin.	Finnish
Fl.	Flemish
Fr.	French
Ger.	German
Gr.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ic.	Icelandic
In.	Indonesian
It.	Italian
Jap.	Japanese
Kor.	Korean
Latv.	Latvian
Lith.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Sl.	Slovak
Sp.	Spanish
Sw.	Swedish
Th.	Thai
Turk.	Turkish
Uk.	Ukrainian
Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
mC,μC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
NAP	nicotanamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotide phosphate
NADPH	reduced nicotinamide adenine dinucleotide phosphate
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

901 STUDIES ON THE MICROSCOPIC ANATOMY OF THE VEINS IN THE ESOPHAGOGASTRIC TRANSITION ZONE IN MAN. (E.) Ferraz de Carvalho, C. A. (U. Sao Paulo Fac. Med., Brazil). *Rev. Hosp. Clin. Fac. Med. Sao Paulo* 25(5):289-302, 1970.

Muscular, collagenous, and elastic components in vessels of the rete mirabile venous system of the esophagogastric transition were studied. In veins with more longitudinal oriented muscle bundles, the relatively abundant collagenous fibers are arranged as very thin nets of elongated fibers according to the long axis of the vessel. Veins without muscle cells in their walls have collagenous fibers in arrangements similar to those in the muscularis mucosae, where they are arranged as a tridimensional net of fibers crossed in fundamental directions, forming meshes, and elongated according to the long axis of the organ; however, such an arrangement is valid only for the esophageal part of the transitional zone, since the fiber bundles are multidirectional in the stomach.

902 THE DISTRIBUTION OF PANETH CELLS IN THE HUMAN SMALL INTESTINE. (E.) Singh, I. (Med. Coll., Rohtak, India). *Anat. Anz.* 128(1): 60-65, 1971.

The density of Paneth cells was lowest about the middle of the small intestine in biopsy specimens from 5 adults. Highest levels were found either in the most proximal part or the most distal part, or in both. The essential feature common to all cases was the presence of a U-shaped curve. The presence of numerous patches of lymphoid tissue is a factor that leads to a considerable reduction in the number of crypts (and consequently of Paneth cells) in the terminal parts of the ileum. Thus, if calculated in terms of unit length of intestine, the relative density of Paneth cells would probably be distinctly higher in the duodenum, and lower in the terminal ileum.

903 RAT SMALL INTESTINE: DEVELOPMENT, COMPOSITION AND EFFECTS OF PERFUSION. (E.) Miller, D. L. (U. Iowa Dept. Intern. Med., Iowa City). *Am. J. Dig. Dis.* 16(3):247-254, 1971.

Body weight and small intestine length and weight were measured in young Sprague-Dawley rats before perfusion, and in adult rats before and after perfusion. Values for perfused intestine did not differ significantly from those of nonperfused ntestine. There was a positive correlation between body weight and intestinal weight, length, and nitrogen concentration in rats weighing more han 125 g. At birth, intestine weight was bout 1.4% of body weight (5 g). In rats weighing 5 g, the intestines were 20-45 cm long and weighed 2.4% of body weight, while 60-g adolescent rats had intestinal lengths about 75% of adult length (80 cm) and weights about 5% of body weight. In 125-g rats, the intestine was 95 cm long and 4% of body wt. After this, length increased by only 10-20 cm, and weight increased by 1-2 g. The proportion of intestine to body weight then continued to decrease, being 1.4% in rats weighing 500 g. In adult rats, each 100-g increase in body weight was accompanied by a 5-cm increase in length and a 0.5-g increase in intestinal weight. Water content of intestinal tissue varied with age and site, being greatest in the duodenum.

904 INTRAEPITHELIAL CELLS IN THE HUMAN INTESTINAL MUCOSA. (E.) Toner, P. G. (Western Infirm., Glasgow, Scotland) and A. Ferguson. *J. Ultrastruct. Res.* 34(3-4):329-344, 1971.

Fine structure of the intraepithelial lymphocytes of human small intestine was studied using jejunal biopsy specimens from patients undergoing surgery for duodenal ulcer, and from those with celiac disease and possible small intestine disease. These cells were generally larger than peripheral lymphocytes, and they exhibited no desmosomal attachment between each other or with adjacent epithelial cells. They often had irregular outlines, sparse cytoplasmic organelles and a compact nucleus. Intraepithelial lymphocytes did not differ in normal intestine and intestines with celiac disease. Intraepithelial eosinophils and mast cells were also identified by their inclusions. Breaks in the basal lamina through which epithelial cells projected were thought to be caused by the passage of migrating lymphocytes. No significant differences in cellular ultrastructure were observed between normal patients or those with celiac disease.

905 PATTERNS OF MUCIN SECRETION IN HUMAN INTESTINAL MUCOSA. (E.) Subbuswamy, S. G. (Newcastle Gen. Hosp., Newcastle upon Tyne, England). *J. Anat.* 108(2):291-293, 1971.

Sections from different parts of adult human intestine were stained with a combined Alcian blue- periodic acid Schiff (PAS) staining technique to demonstrate acid and neutral mucins. Goblet cells lining the villi in both regions of the small intestine, stained almost entirely with PAS alone, indicating a high neutral mucin content. Goblet cells of the cecum, large intestine, and appendix stained mostly with Alcian blue, indicating a high acid mucin content. Observed staining differences appear to be due to differences in cell types rather than in cell environment.

906 THE DOG PANCREATIC X CELL: A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Lazarus, S. S. (Kingsbrook Jewish Med. Ctr., Brooklyn, N. Y.) and S. H. Shapiro. *Anat. Rec.* 169(3):487-500, 1971.

The X cells of normal dog pancreas were characterized by acidophilic cytoplasmic granules, which did not stain with iron or phosphotungstic acid hematoxylin (as opposed to A cells), and a multilobate nucleus. They were neither argyrophilic nor argentaffinic. Ultramicroscopically, fixed in osmium, the X cell contained agranular, single membrane-bounded secretory granules with amorphous content of low electron density. After double fixation in glutaraldehyde and osmium, the granules appeared irregularly round, ovoid, or kidney-shaped; their content varied from electron lucent to homogeneously electron dense with gradations between. The X cells of the dog pancreas are morphologically distinct secretory elements, independent of other exocrine or endocrine cell types (islet or acinar cells), and possibly endocrine in nature.

907 ULTRASTRUCTURE OF HUMAN EXOCRINE PANCREATIC TISSUE. (Ger.) Kern, H. F. (U. Heidelberg 1st Anat. Inst., Germany) and H. Ferner. *Z. Zellforsch. Mikrosk. Anat.* 113(3): 322-343, 1971.

Electron microscope examination of pancreatic tissue from 5 patients with islet-cell adenomas and 2 controls who died accidental deaths revealed that the secretory pattern is the same as that previously demonstrated in the guinea pig. Proteins synthesized along the endoplasmic reticulum are transported in the form of transport vesicles through its cisternae to the Golgi apparatus. Secretory vacuoles which are released from the concave inner surface of the Golgi apparatus are transformed into zymogen granules by condensation. Apparently, in man, zymogen granules in the apical pole of the cell undergo similar changes as those in the Golgi zone. In each acinus the apical and lateral surfaces of exocrine cells are connected by elaborate junctional complexes, while in the adjacent cytoplasm curved bundles of tonofilaments run from one junctional complex to another and also extend over a long distance into the cytoplasm. Epithelial cells in the intercalated ducts are connected with exocrine cells by the same pattern of junctional complexes and tonofilaments. Their cytoplasm contains a small Golgi complex and a single cilium which extends through a funnel-shaped indentation in the cell surface into the lumen of the intercalated duct. In contrast to chicken exocrine cells, human exocrine cells showed no evidence of cilia.

908 MORPHOMETRIC ANALYSIS OF THE RAT LIVER CELL IN THE PERINATAL PERIOD. (E.) Rohr, H. P. (U. Basel Inst. Pathol., Switzerland), A. Wirz, L. C. Henning, U. N. Riede and L. Bianchi. *Lab. Invest.* 24(2):128-139, 1971.

Ultrastructural studies of rat liver (performed 3 days before birth, at birth and 1, 3 and 8 days after birth) revealed 2 growth phases: from 3 days before birth until delivery, and from the 3rd postpartum day. During the first phase there was an increase in volume of individual hepatocytes, a decrease in volume density of ribosomal components, and a marked increase in glycogen synthesis and in the surface density of mitochondrial cristae. During the first 3 days after birth there was a reduplication of liver cells followed by 2 further reduplications until day 8. At birth, the volume densities of microbodies and mitochondria were markedly increased compared with 3 days previously. On the 1st postpartum day there was an increase in both hepatocyte volume and in volume density of rough endoplasmic reticulum, as well as a rapid mobilization of glycogen synthesized during the 3 previous days. There was also an increase in volume density of lysosomes and of the Golgi apparatus. The results are applicable to hypotheses concerning the transformation of rough to smooth endoplasmic reticulum.

909 STEREOLOGICAL ANALYSIS OF THE ULTRASTRUCTURE OF LIVER PARENCHYMAL CELLS DURING PREGNANCY AND LACTATION. (E.) Hope, J. (Unilever Res. Lab., Sharnbrook, Bedford, England) *J. Ultrastruct. Res.* 33(3-4):292-305, 1970.

Liver parenchymal cells of rats showed an increase in cytoplasmic volume on days 3 and 14 of gestation, but this was not pronounced; however, from days 0-9 of lactation this volume was double that of controls. The volume proportion of rough endoplasmic reticulum increased markedly after day 9 of gestation, peaked at 21 days, and decreased rapidly with parturition (being similar to control values during lactation). The volume proportion of microbodies was increased on day 3 of gestation and thereafter it decreased to a significantly low level, followed by an increase by the 18th day of lactation and another decrease by the 49th day.

910 LOBULAR STRUCTURE OF THE HUMAN LIVER FROM THE VIEWPOINT OF HEPATIC VASCULAR ARCHITECTURE. (E.) Takahashi, T. (Tohoku U. Sch. Med., Sendai, Japan). *Tohoku J. Exp. Med.* 101(2):119-140, 1970.

The vascularization of the normal human liver, as revealed by the graphical reconstruction of the vascular trees, was characterized by a relation between the portal and hepatic veins, that is a regular interdigitation with a uniform distance between these blood vessels. This regularity of pattern was the only distinctive characteristic of the hepatic vascular architectu when compared with that of other organs. The lobular pattern of the liver depended entirely upon the particular orientation of the afferent and efferent vascular systems, the concept of the hepatic lobule as a preformed structural unit eing untenable. A histometric method was used o estimate the length (L) of the shortest outes through points randomly taken in an organ. ince the distribution of L could be approximated y a normal distribution, the ratio L_{max}/L_{min} ndicated the inequality in the length of apillary routes and consequently the irregularity f the vascular interdigitation of each organ. n the examined organs the ratio was smallest in he liver (3) and largest in the renal cortex above 50). In organs with small ratios, a non- egulatory and steady peripheral circulation was ssumed, while alternate or regulatory flow, which eveloped from intermittent flow in the afferent essels because of their regulatory activity, was onsidered necessary to sustain the peripheral irculation in organs with large ratios.

11 ELECTRON MICROSCOPY OF SQUIRREL MONKEY PAROTID GLANDS. (E.) Cowley, L. H. U. Alabama Inst. Dent. Res., Birmingham) and . M. Shackleford. *Ala. J. Med. Sci.* 7(3):273-282, 970.

12 HISTOMORPHOLOGICAL STUDIES OF THE PORCINE PAROTID GLAND AS RELATED TO GE: BIRTH TO EARLY ADULTHOOD. (E.) Koppang, . S. (Iowa State U. Coll. Vet. Med., Ames) and . Getty. *Growth* 34(3):321-340, 1970.

13 SURGICAL ANATOMY OF THE PAROTID REGION. (Fr.) Farisse, J. (Conception Hosp., arseille, France), J. Bonnoit and V. Di Marino. .R. *Assoc. Anat. (Paris)* 147:254-261, 1970.

14 KARYOMETRIC STUDIES ON THE RELATION BETWEEN RAT THYROID AND SALIVARY GLANDS. ol.) Szymik, N. (Gen. Pathol. Inst., Katowice, land). *Folia Morphol. (Warsz.)* 29(3):365-371, 970.

5 THE MUSCLE STRUCTURE OF HUMAN STOMACH AND ITS RELATION TO THE DEVELOPMENT OF STRIC ULCERS WITH SPECIAL REFERENCE TO THE NGITUDINAL MUSCLE FIBERS. (E.) Nakamura, N. ikei U. Sch. Med., Tokyo). *Nippon Heikatsukin kkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4): 5-262, 1970.

6 THE FINE STRUCTURE AND DIHYDROXYPHENYLALANINE UPTAKE OF THE DEVELOPING RIETAL CELLS OF THE RAT STOMACH. (E.) Penttilä, (U. Helsinki Dept. Anat., Finland). *Z. Anat. twicklungsgesch.* 132(1):34-49, 1970.

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919 COMPARATIVE GASTRIC HISTOLOGY OF FIVE NORTH AND CENTRAL AMERICAN BATS. (E.) Rouk, C. S. (Baylor U. Dept. Biol., Waco, Tex.) and B. P. Glass. *J. Mammal.* 51(3):455-472, 1970.

920 STUDY ON A RELATIONSHIP BETWEEN THE ANATOMICAL CHARACTERISTICS OF THE GASTRO-DUODENAL JUNCTION AND THE LOCATION OF DUODENAL ULCERS. (E.) Yoshikawa, K. (Jikei U. Sch. Med., Tokyo). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4):290-311, 1970.

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922 DISSECTION OF THE MUSCLE OF TREITZ. (Fr.) Argeme, M. (Sch. Med., Marseille, France), A. Mambrini, G. Lebreuil and G. Guerinel. *C.R. Assoc. Anat. (Paris)* 147:76-86, 1970.

923 CYTOKINETICS OF ARGENTAFFIN CELLS IN MOUSE INTESTINAL MUCOSA. (Rev.) Odartchenko, N. (Swiss Inst. Exp. Cancer Res., Lausanne). *Virchows Arch. [Zellpathol.]* 6(2): 132-136, 1970.

924 EFFECTS OF INTERNAL AND EXTERNAL IRRADIATION ON PEYER'S PATCHES. (Rus.) Ponomareva, T. V. (Inst. Radiat. Hyg., Leningrad, USSR). *Arkh. Anat. Gistol. Embriol.* 59(9): 69-75, 1970.

925 EFFECTS OF CYCLOPHOSPHAMIDE ON THE ULTRASTRUCTURE OF PEYER'S PATCHES. (E.) Chin, K. N. (U. Sheffield Dept. Hematol., England) and G. Hudson. *Br. J. Exp. Pathol.* 51(6):563-569, 1970.

926 ULTRASTRUCTURE OF THE SMALL INTESTINAL MUCOSA IN NEWBORNS. (Sl.) Plank, J. (Comenius U. Sch. Med., Czechoslovakia) and O. Beseda. *Bratisl. Lek. Listy* 54(3):275-280, 1970.

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931 A FINE STRUCTURAL ANALYSIS OF INTERCELLULAR JUNCTIONS IN THE MOUSE LIVER. (E.) Goodenough, D. A. (Harvard Med. Sch., Boston, Mass.) and J. P. Revel. *J. Cell. Biol.* 45(2):272-290, 1970.

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933 PARIETAL PROJECTION OF THE ANTERIOR MARGIN OF THE LIVER IN ADULTS (STATISTICAL STUDY). (Fr.) Caix, M. (Sch. Med., Limoges, France), P. Cubertafond and G. Outrequin. *C.R. Assoc. Anat. (Paris)* 148:295-311, 1970.

934 SUBCELLULAR LOCALIZATION OF COPPER IN THE LIVER OF COPPER-DEFICIENT RATS. (E.) Balevska, P. (Inst. Physiol., Sofia, Bulgaria). *Izv. Inst. Fiziol. Rast. Metodi Popov* 13:289-294, 1970.

935 EFFECTS EXERTED IN VIVO BY HISTONES EXTRACTED FROM CALF THYMUS (P II) ON THE PERITONEAL MACROPHAGES OF MICE AND GUINEA PIGS. (Fr.) Pelletier, M. (Pasteur Inst., Garches, France) and A. C. Delaunay. *C.R. Acad. Sci. [D] (Paris)* 271(22):2064-2067, 1970.

936 HISTOCHEMICAL STUDY OF HUMAN GASTROINTESTINAL MUCINS. (Fr.) Ganter, P. (UER Dept. Anat. Pathol., Cordeliers, France) and C. Marche. *Ann. Anat. Pathol.* 15(3):321-346, 197

937 DIAMETER OF GASTROINTESTINAL ARTERIES AND THE AORTA AT THEIR ORIGIN IN CHILDREN (EXCLUDING THE INFERIOR MESENTERIC ARTERY). (Fr.) Debrun, G. (Hosp. Sick Child., Paris) and M. Labrune. *Ann. Radiol. (Paris)* 13(9-10):727-729, 1970.

938 SYNAPTIC CONNECTIONS OF VAGUS FIBERS I THE MYENTERIC PLEXUS. (Fr.) Filogamo G. (U. Turin Inst. Human Anat., Italy) and G. Gabella. *C.R. Assoc. Anat. (Paris)* 148:357-359, 1970.

See also numbers: 973, 1044, 1118, 1157

939 STIMULATION OF THE WATER TRANSPORT IN THE JEJUNUM OF THE RAT BY ETHYL ACETATE. (E.) Csáky, T. Z. (U. Kentucky Coll. Med., Lexington), G. Esposito, A. Faelli and V. Capraro. *Proc. Soc. Exp. Biol. Med.* 136(1): 242-244, 1971.

Ethyl acetate as well as glucose markedly enhanced the weight increase, and thus the fluid uptake, of everted rat intestinal loops immersed in Krebs-Ringer bicarbonate solution. Neither glucose nor ethyl acetate produced any change in the low rate of water transport observed in a sodium free Krebs-Ringer medium, suggesting that net water transport, particularly its stimulation, is closely related to sodium transport Tetraethyl pyrophosphate, a known esterase inhibitor, eliminated the stimulatory effect of ethyl acetate in intestinal water transport. These results suggest that the acetate ion was released intracellularly from the ethyl acetate, at which point it stimulated water transport.

940 STUDIES OF INTESTINAL FLUID TRANSPORT. I. ESTIMATION OF THE EXTRACELLULAR SPACE OF EVERTED SACS OF RAT SMALL INTESTINE. (E.) Jackson, M. J. (George Washington U. Med. Ctr., Washington, D. C.), M. M. Cassidy and R. S. Weller. *Biochim. Biophys. Acta* 211(3):425-435, 1970.

Intestinal extracellular space was studied in vitro with everted sac preparations using Carbowax 1000, Carbowax 4000, inulin, and mannitol as probing solutes. Serosal solute spaces of high molecular weight compounds (Carbowax 1000 and 4000 and inulin) were similar and were smaller than the serosal mannitol space. In contrast to previous studies, it was demonstrated that intestinal extracellular space consists of 2 anatomically distinct compartments: adherent mucosal fluid and serosal extracellular space. Penetration of the serosal extracellular space by Carbowax 4000 was not influenced by fluid transport, indicating that Carbowax 4000 equilibrates with the space it penetrates. Since mannitol may penetrate the intracellular compartment, the high molecular weight solutes are preferred in studies of the extracellular compartment in fluid transport.

941 STUDIES ON INTESTINAL FLUID TRANSPORT. II. THE LOCATION OF FLUID ACCUMULATED IN THE WALL OF RAT JEJUNUM DURING INCUBATION IN VITRO. (E.) Jackson, M. J. (George Washington U. Med. Ctr., Washington, D. C.) and M. M. Cassidy. *Biochim. Biophys. Acta* 211(3):436-447, 1970.

Distribution of fluid taken up by the intestinal wall during in vitro incubation of everted sacs of the rat mid-jejunum was studied in an attempt to relate structural changes with a functional estimate of extracellular space. A linear relation was observed between fluid uptake and serosal fluid transport over the range studied. Values for the serosal space obtained with glycerol or urea were much greater than the values obtained with PEG 4000, and were in good agreement with the values for total tissue water determined on sacs which had been incubated under the same conditions. The dimensions of epithelial cells varied linearly with intestinal fluid uptake. Fluid uptake could not be accounted for by an expansion of an extracellular space. Glucose, fructose, and mannose gave greater fluid uptakes than sorbose, and no variation in the serosal PEG 4000 space was observed. The swelling of epithelial cells may indicate a specialized mechanism of fluid transport at the luminal cell border.

942 CHOLESTEROL AND BILE SALT INFLUXES ACROSS BRUSH BORDER OF RABBIT JEJUNUM. (E.) Schultz, S. G. (U. Pittsburgh Sch. Med., Pa.) and C. K. Strecker. *Am. J. Physiol.* 220(1):59-65, 1971.

Unidirectional influx of labeled cholesterol across the brush border of rabbit jejunum varied directly with concentration, showed little dependence on temperature, and was not directly affected by the presence of β-sitosterol or influenced by preloading. Apparently the influx occurs on the basis of simple diffusion and is generally dependent on the presence of bile salts. The influx of taurodeoxycholate varied directly with concentration above and below the critical micellar concentration, and was much greater than the simultaneous influx of cholesterol. The various ratios of these influx values suggest that intact, cholesterol-containing micelles do not cross the brush border.

943 REVERSIBLE INHIBITION OF INTESTINAL ACTIVE SUGAR TRANSPORT BY DECONJUGATED BILE SALT IN VITRO. (E.) Gracey, M. (U. Birmingham Inst. Child Health, England), V. Burke and A. Oshin. *Biochim. Biophys. Acta* 225(2): 308-314, 1971.

In vitro uptake of arbutin by the small intestine was studied in incubated rat tissue to determine whether inhibition of intestinal sugar transport caused by deconjugated bile salts in vitro is due to irreversible cellular destruction. Sodium taurocholate (10 mM) had no significant effect on arbutin uptake. Sodium deoxycholate (0.5 mM) competitively inhibited the uptake of arbutin. This inhibition was reversible and therefore was not the result of tissue damage.

944 RELATIONSHIPS BETWEEN DISACCHARIDE HYDROLYSIS AND SUGAR TRANSPORT IN

AMPHIBIAN SMALL INTESTINE. (E.) Parsons, D. S. (U. Oxford Dept. Biochem., England) and J. S. Prichard. *J. Physiol. (Lond.)* 212(2):299-319, 1971.

When the small intestine of *Rana pipiens* or of *Bufo vulgaris* was perfused *in vitro* through its vascular system with Ringer's solution containing serum albumin and fluid containing uniformly-labeled ^{14}C-glucose was circulated through the lumen, the apparent specific activity of the glucose in the vascular effluent did not differ significantly from that in the lumen, and the apparent specific activity of glucose in the lumen did not change with time over a 30-min period. In *R. pipiens* changes in the ionic composition of the vascular and luminal fluids or the addition of phlorizin or strophanthin consistently reduced the rate of glucose translocation in the vascular effluent, but had little effect on maltase activity *in situ*. Replacement of Na$^+$ with Li$^+$ in the lumen did reduce maltase activity somewhat. When Tris buffer was substituted for luminal Na$^+$, the buffer cation competitively inhibited maltase activity *in situ*, but had little effect on the rate of glucose translocation into the vascular effluent. Apparently this increased the efficiency with which cellular systems involved in glucose translocation captured liberated glucose. Glucose initially present in the intestinal lumen competed with glucose derived from maltose or trehalose for transepithelial translocation. Although there was no evidence of competition between maltose and trehalose for hydrolysis, the glucose liberated from these 2 disaccharides competed for translocation. Thus, it is impossible to dissociate the processes of disaccharide hydrolysis from those involved in translocation of hexose into the vascular effluent. These findings suggest that monosaccharides released by disaccharide hydrolysis have access to a pool of glucose which is equally accessible to glucose free in the intestinal lumen, and that the rate of glucose translocation is determined by the concentration of glucose in the pool. By setting up a model operating on these principles, it is possible to accurately predict the relative contribution of dissacharides and monosaccharides in the intestinal lumen to glucose appearing in the vascular effluent.

945 PATTERNS OF NEUTRAL AMINO ACID UPTAKE ALONG RAT SMALL INTESTINE. (E.) Baker, R. D. (U. Texas Med. Branch, Galveston) and M. J. George. *Biochim. Biophys. Acta* 225(2):315-325, 1971.

The uptake of 7 neutral amino acids by various portions of the rat small intestine was studied *in vitro* to determine their transport patterns. There was enough variation in the uptake patterns of the amino acids to claim the involvement of 2 transport systems (called N$_1$ and N$_2$) that are distributed differently along the intestine. L-Methionine and betaine exhibited 2 extreme patterns. The amino acids exhibiting uptake patterns between these two extremes (L-leucine, L-alanine, L-proline, glycine and α-aminoisobutyric acid) seemed to be transported by both N$_1$ and N$_2$. When methionine was added to competitively exclude proline from N$_1$, the uptake pattern of proline was shifted toward that of betaine.

946 LIPID ABSORPTION AND LIPID-REESTERIFYING ENZYME ACTIVITY IN SMALL BOWEL OF THE PROTEIN-DEFICIENT RAT. (E.) Rodgers, J. B., Jr. (Albany Med. Coll., N. Y.). *Am. J. Clin. Nutr.* 23(10):1331-1338, 1970.

Specific activities of fatty acid coenzyme A (CoA) ligase and of acyl-CoA-monoglyceride acyltransferase in microsomal fractions of jejunal mucosa were similar in both fasting and nonfasting rats fed a protein-free diet for 4 weeks and in controls. Total enzyme activities were significantly lower in experimental animals. These differences disappeared when total activities were expressed per gram weight of mucosa. *In vivo* measurement of lipid absorption with labeled triglyceride and free fatty acid showed no evidence of manifest malabsorption of either free fatty acid or triglycerides in protein-deficient rats.

947 ROLE OF THE DUODENUM IN VITAMIN D$_3$ ABSORPTION IN MAN. (E.) Hollander, D. (Wilford Hall Hosp., Lackland Air Force Base, Tex.), S. J. Rosenstreich and W. Volwiler. *Am. J. Dig. Dis.* 16(2):145-149, 1971.

After an overnight fast, 6 healthy adult males were intubated with a triple-lumen tube with one lumen opening in the gastric antrum (to check for regurgitation of labeled vitamin D), the second opening in the proximal zone of the second portion of the duodenum and the third opening 60 cm beyond the proximal portion. Thirty min prior to infusion, 1,400 IU of either ^{3}H- or ^{14}C-labeled vitamin D$_3$ were dissolved in 10 ml of a micellar solution, and the subjects were then fed a test meal. Stools were collected for 7 days and net apparent absorption of the 2 isotopes was calculated. The mean apparent absorption of vitamin D$_3$ from the duodenal infusi was 77% (range 63-85%) and that from the jejunal infusion was 65% (range 42-83%). This differenc is considered significant, and it is concluded that the duodenum is not as efficient in the absorption of vitamin D as the rest of the small intestine.

948 STUDIES ON THE MECHANISM OF ACTION OF CALCIFEROL. IV. INTERACTION OF THE POLYENE ANTIBIOTIC, FILIPIN, WITH INTESTINAL MUCOSAL MEMBRANES FROM VITAMIN D-TREATED AND VITAMIN D-DEFICIENT CHICKS. (E.) Wong, R. G.

(U. California Dept. Biochem., Riverside), T. H. Adams, P. A. Roberts and A. W. Norman. *Biochim. Biophys. Acta* 219(1):61-72, 1970.

Filimarisin treatment (2 x 10^{-5} M) of ileal segments from vitamin D-deficient chicks increased the calcium flux 150-250%, but had no effect on vitamin D-treated chicks. This effect was specific for calcium translocation and was not mediated by a general increase in permeability. Gross morphological changes were observed in the microvillar region in ileal segments of vitamin D-deficient chicks only after prolonged exposure (80 min) to filimarisin on the mucosal side. A fundamental difference appears to exist in some structural aspect of the intestinal microvillar membranes of the vitamin D-deficient and vitamin D-treated chick ileum.

949 VITAMIN D: A CHOLECALCIFEROL METABOLITE HIGHLY ACTIVE IN PROMOTING INTESTINAL CALCIUM TRANSPORT. (E.) Myrtle, J. F. (U. California Dept. Biochem., Riverside) and A. W. Norman. *Science* 171(3966):79-82, 1971.

Two different metabolites of vitamin D_3 (cholecalciferol) were isolated from the intestine and blood of vitamin D_3-deficient White Leghorn cockerels injected intracardially with ^{3}H-labeled cholecalciferol (50 IU) 24 hr before sacrifice. The intestinal vitamin D_3 metabolite was 4.5 times as effective as vitamin D_3 itself and twice as effective as 25-hydroxycholecalciferol or the blood metabolite in stimulating intestinal Ca^{++} transport 24 hr after p.o. administration. Between 24-48 hr after intracardiac administration, vitamin D_3 and 25-hydroxycholecalciferol produced maximum stimulation of intestinal Ca^{++} transport, while maximum stimulation occurred only 9 hr after intracardiac administration of the intestinal vitamin D_3 metabolite. At 9 hr after p.o. administration this vitamin D_3 metabolite was at least 13 times more active than the parent compound. These results provide evidence that the intestinal vitamin D_3 metabolite is the active form of cholecalciferol in the intestine.

950 INACTIVATION OF VITAMIN B_{12} BY A BINDER IN RAT INTESTINE AND THE ROLE OF INTRINSIC FACTOR. (E.) Okuda, K. (Kurume U. Sch. Med., Japan), T. Kitazaki and M. Takamatsu. *Digestion* 4(1):35-48, 1971.

In the absence of intrinsic factor, small amounts of Co^{57}-labeled vitamin B_{12} placed in a prepared rat intestinal loop were either adsorbed onto the mucosa or bound to a macromolecular substance in the lumen and thus became unabsorbable. Only a large excess of intrinsic factor with respect to B_{12} binding capacity made complexed macromolecular B_{12} available for absorption. However, the mucosa of rat small intestine had a considerable capacity to bind B_{12}, probably on the surface, and apparently released a nonintrinsic factor B_{12} binder into the lumen. Pronase counteracted this inactivating reaction in the loop, and kept small doses of B_{12} in a free form for long periods of time, effecting an absorption that was slow but comparable to that obtained with intrinsic factor. The B_{12} inactivating reaction counteracted by pronase in this study may be under suppression by pancreatic juice in normal intestinal physiology. Perhaps B_{12} malabsorption in pancreatic insufficiency is related to this reaction.

951 EFFECT OF INTRALUMINAL pH ON THE ABSORPTION OF PTEROYLMONOGLUTAMIC ACID. (E.) Benn, A. (Gen. Hosp., Birmingham, England), C. H. J. Swan, W. T. Cooke, J. A. Blair, A. J. Matty and M. E. Smith. *Br. Med. J.* 1(5741): 148-150, 1971.

Greater impairment of folate absorption occurred in controls following the concurrent administration of either diphenylhydantoin sodium (100 mg) or sodium bicarbonate (10 g) and folic acid (5 mg) than with folic acid alone. The epileptic group showed impaired folic acid absorption below the control range; this effect was unchanged by the administration of folic acid and sodium bicarbonate. In normal subjects, folate absorption was impaired following 10 days of anticonvulsive therapy. The 3 epileptics with the most alkaline intraluminal (duodenum and jejunum) pH previously had folic acid-deficient megaloblastic anemia. The jejunal intraluminal pH traces in 2 normal subjects following sodium bicarbonate administration revealed protracted alkalization of the jejunal contents, and the return to normal intraluminal pH was delayed. In a clinical situation such as celiac disease, alteration in the jejunal pH may be a significant factor in folate malabsorption.

952 FOLIC ACID ABSORPTION IN PREGNANCY: COMPARISON OF THE PTEROYLPOLYGLUTAMATE AND PTEROYLMONOGLUTAMATE. (E.) McLean, F. W. (U. Florida Coll. Med., Gainesville), M. W. Heine, B. Held and R. R. Streiff. *Blood* 36(5): 628-631, 1970.

Gastrointestinal absorption of naturally-occurring folate (pteroylpolyglutamate) and therapeutic folate (pteroylmonoglutamate) was studied in 9 women with no evidence of malabsorption in the last half of pregnancy to determine the effect of large quantities of estrogen and progesterone on folate absorption during gestation. No significant difference in absorption of the folate compounds was observed. All estriol determinations were in the normal range for a given duration of gestation. Folic acid absorption was not selectively changed by the elevated hormone levels.

953 MAGNESIUM ABSORPTION BY EVERTED SACS OF RAT INTESTINE AND COLON. (E.)

Aldor, T. A. M. and E. W. Moore (Med. Coll. Virginia, Richmond). *Gastroenterology* 59(5): 745-753, 1970.

The effects of glucose, 2,4-dinitriphenol, and calcium on magnesium absorption were investigated in everted sacs of rat small intestine and colon. At low mucosal Mg^{++} levels, the specific activity of Mg^{++} ($^{28}Mg^{++}$) in serosal fluid was considerably less than in mucosal fluid, indicating either leakage of unlabeled tissue Mg^{++} or exchange of $^{28}Mg^{++}$ with the unlabeled cellular pool during transport. Both gut wall uptake and transport of Mg^{++}, calculated as the ratio of total serosal fluid radioactivity to the specific activity of the mucosal bath, were linearly related to mucosal concentrations at all levels of bowel and decreased progressively from proximal to distal bowel. Omission of glucose from the mucosal bath tended to enhance Mg^{++} transport into serosal sac fluid, but this trend never reached statistical significance. Addition of 2,4-dinitriphenol tended to reverse this depressive effect of glucose. Addition of calcium (1 mM and 5 mM) to the incubation medium statistically decreased mean Mg^{++} transport. Simple ionic diffusion is probably the major mechanism of Mg^{++} absorption, at least at high mucosal concentrations. Active or enhanced transport cannot be excluded, however, because of the inequality of serosal to mucosal specific activity ratios at low mucosal concentrations.

954 AMMONIA ABSORPTION FROM THE HUMAN COLON. THE ROLE OF NONIONIC DIFFUSION. (E.) Castell, D. O. and E. W. Moore (Med. Coll. Virginia, Richmond). *Gastroenterology* 60(1): 33-42, 1971.

Ammonia absorption was studied in 4 patients (who had undergone colon bypass surgery for chronic hepatic encephalopathy) by direct perfusion of various solutions at either pH 5 or pH 9, with NH_4^+ concentrations of 10-150 μg/ml, and at a rate of 15 ml/min for 20-min periods into the proximal colonic stomata. In all patients at both pH levels, the absorption of ammonia was linearly or slightly curvilinearly related to NH_4^+ concentration. In all cases, absorption at pH 9 was greater than that at pH 5. It is concluded that ammonia absorption from the human colon is mediated by nonionic diffusion.

955 STILBOESTROL TRANSPORT AND GLUCURONIDE FORMATION IN EVERTED SACS OF RAT INTESTINE. (E.) Fischer, L. J. (Oakdale Toxicol. Ctr., Iowa) and P. Millburn. *J. Pharmacol. Exp. Ther.* 175(2):267-275, 1970.

Intestinal sacs were relatively impermeable to ^{14}C-stilbestrol monoglucuronide, but ^{14}C-stilbestrol readily entered the everted sacs, thus producing a high concentration of radioactivity in the serosal fluid. Intestinal tissue contained equal amounts of the labeled compounds, but in serosal fluid 90% of the radioactivity was present in the monoglucuronide form. Thus, the intestinal sac preparation is seemingly capable of conjugatin stilbestrol with glucuronic acid. The relative proportions of the 2 compounds in mucosal solution varied with the section of intestine.

956 COMPARISON OF ISOCALORIC QUANTITIES OF MEDIUM-CHAIN TRYGLYCERIDE AND CARBOHYDRATE IN PROMOTING WEIGHT GAIN IN SHORT BOWEL RATS. (E.) Hastings, J. and M. D. Levitt (U. Minnesota Dept. Med., Minneapolis). *Am. J. Dig. Dis.* 16(2):135-138, 1971.

In Sprague-Dawley rats, about 90% of the small intestine was resected, with end-to-end anastomosi of the remaining 6 cm of proximal jejunum to the distal 4 cm of the ileum. Rats were then fed diets consisting of chow plus isocaloric quantitie of long-chain triglycerides, medium-chain triglycerides, maltose, or sucrose; each of the 7 rats received each diet for a 2-week period. Mean weight changes in rats on long- and medium-chain triglyceride, maltose, and sucrose diets were -1.1, +0.2, +1.5 and +2.0 g/day, resp. Weight changes with both disaccharides were significantl greater than those with medium-chain triglyceride Despite the fact that the caloric content per g of disaccharide is only 50% that of medium-chain triglycerides, the disaccharides were better absorbed than the medium-chain triglycerides and provided a better source of calories in this experimental diet.

957 UPTAKE AND EFFLUX BY EVERTED INTESTINAL SACS OF MICELLAR CHOLESTEROL IN BILE SALTS AND IN NON-IONIC DETERGENT. (E.) Watt, S. M. (U. Western Australia Dept. Physiol., Nedlands) and W. J. Simmonds. *Biochim. Biophys. Acta* 225(2):347-355, 1971.

At all times (10 min to 2 hr), uptake of labeled cholesterol was greater from bile salt micellar solution, and the difference increased with time. Uptake from bile salt micelles was temperature-dependent, whereas uptake from nonionic micelles was not. Metabolic inhibitors had little effect. When sacs were loaded with isotopic cholesterol from bile salt micellar media, subsequent efflux into buffer, or into unlabeled cholesterol in nonionic micelles or bile salt micelles, was slower than was efflux into a given medium after loading with isotopic cholesterol from nonionic micelles. On the other hand, efflux into bile salt micellar medium was faster for a given load medium than efflux into nonionic micelles. This suggests that the type of detergent may influenc the mode of adsorption of cholesterol to the cell membrane or its penetration and its accessibility for subsequent efflux. Uptake of cholesterol may be a 2-stage process; the second stage is apparently temperature-sensitive and mediated by bile salts.

958 THE IN VITRO UPTAKE AND KINETICS OF RELEASE OF PALMITIC ACID AND TAURODEOXYCHOLATE FROM HAMSTER SMALL INTESTINAL SEGMENTS. (E.) Mishkin, S. (McGill U. Clin., Montreal, Quebec, Canada), M. Yalovsky and J. I. Kessler. *Biochim. Biophys. Acta* 225(2):335-346, 1971.

The uptake of labeled palmitic acid, but not of labeled taurodeoxycholate and inulin, was significantly greater in the proximal small intestine than the distal portion. A significant amount of each labeled substance taken up during the initial incubation period was released by rinsing, and greater amounts of taurodeoxycholate and inulin than palmitic acid were released by both proximal and distal small intestine. The distal small intestine released a greater fraction of palmitic acid than the proximal, its release apparently related to the esterifying activity of the intestine. Efflux apparently occurred from 2 compartments, one with rapid and one with slow turnover. Efflux of the labeled fatty acids from the rapid-turnover compartment was similar to that of inulin suggesting that they occupied the extracellular fluid space. Since the efflux of palmitic acid and taurodeoxycholate from the slow-turnover compartment was slower than that of inulin, superficial binding sites (possibly located in the glycocalyx or microvillous membrane) may be involved in the reversible uptake of these substances.

959 THE UPTAKE OF OLEIC ACID BY RAT SMALL INTESTINE: A COMPARISON OF METHODOLOGIES. (E.) Clark, S. B. (St. Luke's Hosp. Ctr., New York, N. Y.). *J. Lipid Res.* 12(1):43-55, 1971.

In the presence of trioctanoin (a medium-chain triglyceride), the lymphatic output of ^{14}C-labeled triolein was significantly decreased in lymph fistula rats receiving duodenal infusions within the first 60 min of mixed infusion. The effect of trioctanoin on triolein absorption, occurring apparently at an early step in the absorption process, may represent some form of competition in the region of the brush border membrane. In slices of everted rat jejunum, octanoic acid, taken up at 0C, strongly inhibited incorporation into triglyceride and initial uptake of ^{14}C-labeled oleic acid from micellar solutions. Low pH and dimethyl sulfoxide also reduced oleic acid uptake and incorporation into triglyceride; however, decreased temperature (0C), which blocked triglyceride synthesis, did not inhibit oleic acid uptake. Octanoate, dimethyl sulfoxide, or low pH caused no inhibition of oleic acid uptake or esterification when everted sacs of jejunum were incubated. Although information derived from different model systems remains incomplete, evidence obtained both in vivo and in vitro suggests that the intestinal brush border membrane does not function as a simple lipid interface, and that diffusion of nonionized fatty acid molecules is not the rate limiting step in fatty acid uptake.

960 EFFECT OF INOSINE AND ITS METABOLITES ON INTESTINAL IRON ABSORPTION IN THE RAT. (E.) Faelli, A. (U. Milan Inst. Gen. Physiol., Italy) and G. Esposito. *Biochem. Pharmacol.* 19(9):2551-2554, 1970.

961 CHLORIDE TRANSPORT ACROSS THE ISOLATED INTESTINAL MUCOSA OF Testudo graeca. (E.) Giordana, B. (U. Milan Inst. Gen. Physiol., Italy), A. Bianchi and C. Lippe. *Comp. Biochem. Physiol.* 36(2):395-401, 1970.

962 PANCREATIC REGULATION OF ABSORPTION IN THE SMALL INTESTINE. (Rus.) Bannikova, N. A. (Inst. Exp. Med., Leningrad, USSR). *Fiziol. Zh. SSSR* 56(8):1164-1171, 1970.

963 THE COLUMNAR EPITHELIAL CELL OF THE SMALL INTESTINE: DIGESTION AND TRANSPORT. II. (Rev.) (E.) Gardner, J. D. (Natl. Inst. Arthritis Metabol. Dis., Bethesda, Md.), M. S. Brown and L. Laster. *N. Engl. J. Med.* 283(23):1264-1271, 1970.

964 SUGAR ABSORPTION IN RATS WITH INTESTINAL BLIND LOOPS. (E.) Gracey, M. (U. Birmingham Inst. Child Health, England), V. Burke and A. Oshin. *Arch. Dis. Child.* 45(243): 714-715, 1970.

965 INHIBITION OF GLUCOSE ABSORPTION FROM THE INTESTINE WITH TETRACYCLINE. (E.) Gyongyosi, G. (Univ. Med. Sch., Debrecen, Hungary), B. Kelentey, P. Sapy and O. Veress. *Acta Physiol. Acad. Sci. Hung.* 37(3-4):397, 1970.

966 DICARBOXYLIC AMINO ACID INFLUX ACROSS BRUSH BORDER OF RABBIT ILEUM. EFFECTS OF AMINO ACID CHARGE ON THE SODIUM-AMINO ACID INTERACTION. (E.) Schultz, S. G. (U. Pittsburgh Sch. Med., Pa.), L. Yu Tu, O. O. Alvarez and P. F. Curran. *J. Gen. Physiol.* 56(5):621-639, 1970.

967 EFFECT OF DIETARY FATS ON AMINO ACID ABSORPTION IN RAT SMALL INTESTINE. (Pol.) Cieslakowa, D. (Inst. Nutr., Warsaw, Poland), S. Ziemlanski and M. A. Palaszewska. *Acta Physiol. Pol.* 21(5):691-698, 1970.

968 STUDIES ON THE MECHANISM OF ACTION OF CALCIFEROL. I. BASIC PARAMETERS OF VITAMIN D-MEDIATED CALCIUM TRANSPORT. (E.) Adams, T. H. and A. W. Norman (U. California Dept. Biochem., Riverside). *J. Biol. Chem.* 245(17):4421-4431, 1970.

969 STUDIES ON THE MECHANISM OF ACTION OF CALCIFEROL. II. EFFECTS OF THE

POLYENE ANTIBIOTIC, FILIPIN, ON VITAMIN D-MEDIATED CALCIUM TRANSPORT. (E.) Adams, T. H., R. G. Wong and A. W. Norman (U. California Dept. Biochem., Riverside). *J. Biol. Chem.* 245(17):4432-4442, 1970.

970 OBLIGATORY ROLE OF BILE FOR THE INTESTINAL ABSORPTION OF VITAMIN E. (E.) Gallo Torres, H. E. (Hoffmann-La Roche Inc., Nutley, N. J.). *Lipids* 5(4):379-384, 1970.

971 INFLUENCE OF HUMAN SOMATOTROPIC HORMONE ON INTESTINAL ABSORPTION OF ^{47}Ca IN OSTEOPOROTIC AGED PATIENTS. Coscelli, A. (U. Parma Inst. Physical Diag., Italy), M. Tonelli and P. Pietranera. *G. Gerontol.* 18(4):343-346, 1970.

972 EFFECT OF AGE ON CALCIUM ABSORPTION. (E.) Bullamore, J. R. (Gen. Infirm., Leeds, England), J. C. Gallagher and R. Wilkinson. *Lancet* 2(7672):535-537, 1970.

973 RELATION OF CALCIUM TO MUCOSAL STRUCTURE AND VITAMIN B_{12} ABSORPTION IN THE CANINE INTESTINE. (E.) Weisberg, H. (New York Med. Coll., N. Y.) and J. Rhodin. *Am. J. Pathol.* 61(2):141-160, 1970.

974 REGULATION OF INTESTINAL VITAMIN B_{12} ABSORPTION. (Rus.) Volovoi, V. L. (Med. Inst., Tashkent, USSR) and I. G. Sinkova. *Fiziol. Zh. SSSR* 56(9):1257-1262, 1970.

975 THE DIGESTION AND ABSORPTION OF DIETARY FOLATE. (Rev.) (E.) Rosenberg, I. H. (U. Chicago Med. Sch., Ill.) and H. A. Godwin. *Gastroenterology* 60(3):445-463, 1971.

976 SIMULTANEOUS STUDY OF THE ABSORPTION OF TRITIATED PTEROYLGLUTAMIC ACID AND ^{60}Co-VITAMIN B_{12}. (E.) Musso, A. M. (Jose De San Martin Hosp., Buenos Aires, Argentina), S. Kremenchuzky, S. Rochna and E. M. Rochna Viola. *J. Nucl. Med.* 11(10):569-575, 1970.

977 CITRATE AND ISOCITRATE TRANSPORT IN ISOLATED RAT LIVER MITOCHONDRIA. (E.) Max, S. R. (U. Rhode Island Dept. Biochem., Kingston), R. M. Scorpio and J. L. Purvis. *J. Biol. Chem.* 245(18):4807-4813, 1970.

978 DETERMINATION OF THE ENDOGENOUS COMPONENT OF ALIMENTARY LIPEMIA. (E.) Sullivan, J. F. (Creighton U. Med. Serv., Omaha, Nebr.), R. P. Heaney and N. Suchy. *J. Clin. Endocrnol. Metab.* 31(6):640-646, 1970.

979 ROLE OF SURFACE ACTIVE AGENTS IN DRUG ABSORPTION. (Rev.) (E.) Gibaldi, M. (State U. New York Sch. Pharm., Buffalo). *Fed. Proc.* 29(4):1343-1349, 1970.

See also numbers: 903, 1013, 1014, 1048, 1078, 1081

980 SEROTONIN-MEDIATED TRANSMISSION IN INTRAPARIETAL NERVES OF ESOPHAGEAL SMOOTH MUSCLE IN THE DOG. (Fr.) Singh, I. (Coll. Med., Agra, India) and A. Singh. *J. Physiol. (Paris)* 62(5):421-429, 1970.

Studies performed in dogs indicate that serotonin is liberated by the esophagus during transparietal stimulation and acts as a mediator between intramural neurons innervating the smooth muscle. Contraction of circular smooth muscle at the lower end of the esophagus produced by transparietal stimulation was blocked by bromolysergic acid diethylamide (10^{-7}-10^{-6} g/ml) but remained unchanged in the presence of atropine (10^{-7}-10^{-5} g/ml), tubocurarine (5×10^{-6} g/ml), acetylsalicylic acid (10^{-6} g/ml) and hexamethonium (5×10^{-6} g/ml). The conclusion that nerve transmission is mediated by serotonin is supported by reduction in acetylcholine-induced contraction by hexamethonium and bromolysergic diethylamide. However, after treatment with hexamethonium, bromolysergic acid diethylamide did not further reduce the response. These results suggest that acetylcholine acts directly on the muscle and indirectly on intrinsic ganglia neurons, causing release of serotonin at postganglionic endings.

981 PRESSURE INVERSION POINT AT THE UPPER HIGH PRESSURE ZONE AND ITS GENESIS. (E.) Goyal, R. K., M. H. Sangree, T. Hersh and H. M. Spiro (Yale U. Sch. Med., New Haven, Conn.). *Gastroenterology* 59(5):754-759, 1970.

Phasic respiratory alterations in intraluminal pressure were investigated in the high pressure zone between the pharynx and cervical esophagus in 25 unsedated human subjects, aged 3-60 yr, suspected of having esophageal disease. Patients with neuromuscular disorders or those with lesions of the pharynx and pharyngoesophageal sphincter were excluded. In all cases, inspiration was associated with a fall in intraluminal pressure in the cervical esophagus just below the high pressure zone and in the pharynx above it. As the recording catheter was drawn up from the esophagus, the polarity of respiratory excursions changed from a fall in pressure on inspiration to a rise in pressure on inspiration in the lower part of the high pressure zone, and then from an inspiratory rise in pressure to an inspiratory fall in pressure in the upper part of the high pressure zone. The inspiratory rise in pressure was most evident in the part of the high pressure zone at which pressures were at a maximum; this corresponds anatomically to the horizontal fibers of the cricopharyngeal muscle. A brief increase in pressure was observed in this region in 5 patients, just before the muscle was relaxed in response to swallowing. This brief rise in pressure noted before swallowing may be designed to channel pharyngeal air into the lungs rather than the esophagus during the brief inspiratory activity associated with swallowing.

982 CINERADIOGRAPHIC EVALUATION OF THE SWALLOWING ACT IN SCHIZOPHRENIC PATIENTS. (E.) Bragg, D. G. (U. Utah Med. Ctr., Salt Lake City) and A. E. Hussar. *Gastroenterology* 60(2):299-304, 1971.

Cineradiographic observations of a group of psychotic patients failed to show any significant effect of chlorpromazine upon the swallowing act. Moderate swallowing abnormalities included a combination of 2 or more of the following observations: poor proximal esophageal motility, ineffective initiation of the bolus, valleculae and pyriform sinus pooling, and cricopharyngeal dysfunction. Approximately half of the 35 schizophrenic patients showed significant swallowing abnormalities, regardless of medication history, age, or symptomatology. Only 3 of 15 nonschizophrenic mental patients receiving no medication showed any swallowing abnormalities; this is comparable to the incidence among controls. This high incidence of cineradiographic abnormalities of swallowing in chronic schizophrenics explains the relatively high incidence of asphyxiation with food observed in these patients.

983 CANINE GASTRIC PACEMAKER. (E.) Kelly, K. A. (Mayo Clin., Rochester, Minn.) and C. F. Code. *Am. J. Physiol.* 220(1):112-118, 1971.

Gastric electric activity was recorded intermittently for 3 months from the greater and lesser curvatures of 6 fasted dogs after longitudinal resection and recovery to determine the site of origin of the canine gastric pacemaker potential. Following bisection, the pacemaker potential of the greater curvature arose in the orad corpus, had a regular rhythm and a mean frequency of 5.2 cycles/min, and was propagated caudally. At first the potential of the lesser curvature arose from multiple sites and had an irregular rhythm and a mean frequency of 3.2 cycles/min which increased gradually, and by 14 days after bisection was coupled to that of the greater curvature. Resection of the orad corpus along the greater curvature decreased the pacemaker frequency about 1 cycle/min, but the two halves remained electrically coupled. The primary site of origin of the gastric pacemaker seems to be in the greater curvature region of the orad corpus.

984 THE EFFECT OF LATERAL HYPOTHALAMIC LESIONS ON GASTRIC MOTILITY IN DOGS. (E.) Glavcheva, L. (Nencki Inst. Exp. Biol., Warsaw, Poland), E. Rozkowska and E. Fonberg. *Acta Neurobiol. Exp.* 30(3):279-293, 1970.

Lesions were made in the lateral hypothalamus of 4 dogs with gastric fistulas in order to study the effect of the hypothalamus on gastric motor activity during various phases of digestion and on conditioned reflexes. The lesions abolished periodic hunger-like contractions and both conditioned and unconditioned reflexes. The stomach was atonic or showed automatic tonic contractions. Restoration of basic activity reflected by periodic contractions, unconditioned relaxation, and conditioned relaxation occurred in that sequence over a period of some weeks.

985 EVIDENCE THAT ADENOSINE TRIPHOSPHATE OR A RELATED NUCLEOTIDE IS THE TRANSMITTER SUBSTANCE RELEASED BY NON-ADRENERGIC INHIBITORY NERVES IN THE GUT. (E.) Burnstock, G. (U. Melbourne, Parkville, Victoria, Australia), G. Campbell, D. Satchell and A. Smythe. *Brit. J. Pharm.* 40(4):668-688, 1970.

Stimulation of vagal nonadrenergic inhibitory innervation increased the release of adenosine and inosine into vascular perfusates from the stomachs of guinea pigs and toads. Stimulation of portions of Auerbach's plexus isolated from turkey gizzard increased the amount of ATP, ADP, and mainly AMP in the medium collected after 30 min. ATP, when added to toad stomach perfusates, was converted to adenosine, inosine, and a trace of adenine. The most potent inhibitory compounds, of a series of purine and pyrimidine derivatives tested, were ATP and ADP, and as such they are most likely able to act as transmitter substances in view of their high inhibitory potency. ATP (10^{-6}-10^{-4} g/ml) caused relaxation of 12 other gastrointestinal preparations previously shown to contain nonadrenergic inhibitory nerves. Quinidine reduced or abolished the effects of epinephrine or norepinephrine on the teniae coli, usually without reducing responses to ATP or to transmural stimulation of nonadrenergic inhibitory nerves. Increased quinidine concentrations antagonized even relaxations caused by ATP. When tachyphylaxis (desensitization) to ATP had been produced in the rabbit ileum, there was a selective reduction of the inhibitory effects of nonadrenergic innervation. ATP or a related nucleotide is apparently the transmitter substance released by the nonadrenergic inhibitory innervation of the gastrointestinal tract.

986 MOTOR ACTIVITY OF THE HUMAN DUODENUM: CORRELATION WITH ANTRAL CONTRACTION AND WITH ELECTRICAL ACTIVITY. (Fr.) Couturier, D. (CHU Bichat-Beaujon, Paris), C. Rozé and C. Debray. *J. Physiol. (Paris)* 62(5):387-405, 1970.

By means of intraluminal pressure measurements and electromyography, duodenal motility was investigated in 20 fasting patients, aged 32-70 yr, with no evidence of gastrointestinal disease or other diseases which might alter intestinal motility. Antral pressure waves, recorded from the prepyloric region, were correlated with duodenal motor activity at distances up to 14 cm from the antrum. Duodenal motor activity increased significantly for about 40 sec after the onset of an antral pressure wave. Investigation of the time lag between maxima of motor activity 7, 14, and 21 cm from the prepyloric antrum indicated that a propagation phenomenon was involved; the rate was estimated to be 0.6-1 cm/sec from the antrum to the duodenal bulb and 1.5-2.5 cm/sec in the duodenum itself. Electrical slow waves recorded from the mucosa occurred in sequences with variable durations and did not account for more than 30% of the entire tracing. The only correlation between electrical slow waves and mechanical activity was observed during "basal motor rhythm" (4% of the entire tracing). The occurrence of duodenal pressure waves very likely depends upon other triggering factors, even though their rhythm always parallels those of electrical slow waves.

987 ACTION OF CAERULEIN OF INTESTINAL MOTILITY IN MAN. (E.) Bertaccini, G. (Maggiore Hosp., Parma, Italy) and A. Agosti. *Gastroenterology* 60(1):55-63, 1971.

In the upper duodenum there was a reduction in contractile activity (with no change in tone), whereas in the distal duodenum and jejunum, cerulein provoked an increase in tone and motility which was sometimes proportional to the dose and at times showed a certain degree of tachyphylaxis. Threshold stimulant doses were 1-5 ng/kg, i.v. and 10-30 ng/kg, i.m. Following 750 ng/kg caerulein (i.m.), the stimulant effect lasted 20 to 40 min, intestinal transit was strikingly accelerated, and the cecum was reached in 20 to 45 min. Side effects including nausea and abdominal discomfort were minimal following high doses of cerulein. The rise of activity in the colon sometimes resulted in an urge to defecate. Cerulein may be useful in the treatment of some gastrointestinal diseases associated with alteration of motility such as paralytic ileus.

988 IMPAIRMENT OF ALPHA RECEPTOR ACTIVITY INDUCED BY COLD STORAGE IN THE ISOLATED RABBIT DUODENUM. (E.) Salimi, M. (U. Tehran Fac. Vet. Med., Iran), R. Z. Kermani, B. Djahansouz and S. Golshan. *Pharmacology* 4(6): 341-346, 1970.

Response of the duodenum to adrenergic stimulators and blockers and the effect of cold storage on alpha receptors was studied by measuring isotonic longitudinal muscle activity of fresh and cold-stored segments of isolated rabbit duodenum. Sympathomimetic amines (epinephrine, norepinephrine and phenylephrine) caused relaxation of duodenal segments. Phenylephrine activity was completely blocked by phentolamine, but epinephrine and norepinephrine activities were only blocked after combined treatment with propanolol and phentolamine. Threshold concentrations for epinephrine and phenylephrine inhibition of fresh intestine were lower than those for cold-stored duodenum. No difference in threshold concentrations of isoproterenol was observed in fresh and stored segments. Phentolamine was more effective in abolishing phenylephrine effects in cold-stored intestinal segments. Cold storage seemingly produces selective impairment of alpha receptor activity in the rabbit small intestine.

989 THE EFFECT OF PERIARTERIAL NERVE STIMULATION ON THE JEJUNAL AND ILEAL MOTILITY IN CAT. (E.) Kewenter, J. (U. Gothenburg Sahlgren's Hosp., Sweden), P.-E. Pahlin and B. Storm. *Acta Physiol. Scand.* 80(3): 353-359, 1970.

In cats, stimulation of periarterial nerve trunks along the superior mesenteric artery generally elicited excitatory motor responses in the proximal part of the small intestine and inhibitory motor responses in the distal part. However, in most experiments it was possible to induce both excitatory and inhibitory motor responses depending upon the stimulus strength. Clearcut inhibitory motor responses were induced when voltage and/or pulse duration were higher than those necessary to produce an excitatory motor response. Variation in stimulation frequency from 8 to 16 impulses/sec with a constant voltage and pulse duration induced a change from excitatory to inhibitory response in the ileum. Guanethidine (1 mg/kg i.v.) inhibited intestinal inhibitory responses elicited by electrical stimulation because of adrenergic nerve fiber block. Intestinal inhibitory responses were no longer obtained with electrical stimulation after administration of atropine (1 mg/kg i.v.), but jejunal and ileal excitatory motor responses occurred with the same stimulation parameters that had previously elicited inhibitory responses. The periarterial nerves apparently contain 2 different sets of nerve fibers mediating excitatory and inhibitory impulses to the small intestine.

990 EFFECTS OF ALTERED PROPULSION ON RAT SMALL INTESTINAL FLORA. (E.) Summers, R. W. and T. H. Kent (Univ. Hosps., Iowa City, Iowa). *Gastroenterology* 59(5):740-744, 1970.

Effects of physically- and drug-induced changes in propulsion on small intestinal bacterial flora were investigated in male Carworth rats to assess the relative importance of intestinal clearance in regulation of intestinal flora. In contrast to the gross overgrowth of coliforms, enterococci, bacteroids, and Clostridia associated with extreme stagnation resulting from ileal obstruction, agents which moderately retarded propulsion (mecamylamine, chlorisondamine, and morphine) produced only a slight increase in these organisms. Both tolazoline and neostigmine accelerated net intestinal transit, but only a few organisms (Escherichia coli, micrococci, staphylococci, and α-hemolytic streptococci) were significantly decreased. When propulsion was accelerated by indomethacin-induced ulceration or whole-body X-irradiation, overgrowth of bacteria was observed. Since indomethacin and X-irradiation both produced striking pathological changes in the mucosa, factors other than propulsion must be important in regulating the quantity and kind of flora. These results indicate that extreme forms of stagnation are necessary to cause significant bacterial overgrowth in the rat small intestine, and that striking bacterial overgrowth can occur in the absence of retarded propulsion, especially if there is mucosal damage.

991 THE EFFECT OF SOME PSYCHOTROPIC AGENTS ON EMOTIONALLY-INDUCED DEFECATION IN MICE. (Fr.) Allain, P. (Sch. Med. Pharmacol. Inst., Paris) and P. Lechat. *Therapie* 25(4): 655-662, 1970.

When naive male IFFA-Carworth mice were placed in a new environment, an increase occurred in the number of times they defecated. The number of defecations increased still further with exposure to auditory and visual stimuli. In all experiments the increase in the mean number of defecations was paralleled by an increase in the percentage of animals which defecated at least once. Injection of psychotropic agents i.p. 20 min before exposure to stimuli decreased the number of emotionally-induced defecations. Significant decreases were produced by chlorpromazine (1 mg/kg), haloperidol (1 and 2.5 mg/kg), phenobarbital (50 mg/kg), meprobamate (25 and 50 mg/kg), imipramine (10 and 20 mg/kg), and amphetamine (1 and 25 mg/kg). Intestinal transit remained unchanged. The decrease in emotionally-induced defecation produced by amphetamine may result from some state of excitation in which the animal becomes less sensitive to external stimuli.

992 CATIONIC REQUIREMENTS OF COLON SLOW WAVES IN THE CAT. (E.) Wienbeck, M. (U. Iowa Coll. Med., Iowa City) and J. Christensen. *Am. J. Physiol.* 220(2):513-519, 1971.

Changes in the resting membrane potential and slow-wave frequency, amplitude, and duration were measured in strips of circular muscle from the pelvic colon of the cat placed in a sucrose gap when concentrations of Na^+, K^+, Ca^{++}, Mg^{++}, and Mn^{++} were changed in the Krebs-Ringer solution perfusing one end of the muscle. The electrical characteristics of cat colon circular muscle vary independently. Resting membrane potential is quite stable but is decreased by low Ca^{++} and high K^+ concentrations and in the presence of Mn^{++}; high Ca^{++} concentrations cause hyperpolarization. Slow-wave characteristics, especially amplitude, varied much more widely than the resting membrane potential. High Na^+ concentrations increased the amplitude while low Na^+ decreased it slightly and high K^+ concentrations decreased the amplitude. In solutions containing no K^+ the amplitude becomes zero, but after 15-25 min slow waves reappear with decreased amplitude. This phenomenon may be due to loss of intracellular K^+ followed by re-establishment of new equilibrium conditions. The amplitude goes to zero in Ca^{++}-free solutions and with higher Mn^{++} concentrations, but slow waves do not reappear. These findings suggest that slow-wave amplitude depends mainly upon distributions of Na^+ and K^+ across the muscle-cell membrane. The slow-wave frequency is greatly reduced in Na^+-free media but is also decreased by high Na^+ concentrations. Low Ca^{++} concentrations reduced the frequency slightly, and 7.5 mM Ca^{++} increased the frequency significantly only after 30 min. Mg^{++} was the only ion that caused major changes in the slow-wave duration. The duration was prolonged at low concentrations and an increased number of spikes, superimposed on slow-waves, appeared. Excess Mg^{++} reduced the duration and suppressed spiking. These findings indicate that the slow wave in cat colon is Na^+- and Ca^{++}-dependent and resembles the gastric slow wave. Separate Na^+- and Ca^{++}-dependent components were not found within the colonic slow wave.

993 MANOMETRIC AND ELECTROMYOGRAPHIC STUDIES OF ESOPHAGEAL FUNCTION. (Dut.) Hellemans, J. (St. Rafael Acad. Hosp., Louvain, Belgium). *Verh. K. Vlaam. Akad. Geneeskd. Belg.* 32(3):71-184, 1970.

994 ESOPHAGEAL MOTILITY STUDIES IN GLOBUS SENSATION. (E.) Caldarelli, D. D. (U. Illinois Abraham Lincoln Sch. Med., Chicago), A. H. Andrews, Jr. and A. J. Derbyshire. *Ann. Otol. Rhinol. Laryngol.* 79(6):1098-1100, 1970.

995 PHYSICAL ELECTROTONUS FROM THE SMOOTH MUSCLE OF CAT STOMACH. (E.) Boev, K. K. (Inst. Physiol., Sofia, Bulgaria), M. F. Shuba and V. M. I. Taranenko. *Izv. Inst. Fiziol. Rast. Metodi Popov* 13:251-256, 1970.

996 EFFECT OF ETHANOL ON GASTRIC EMPTYING. CLINICAL AND EXPERIMENTAL STUDY. (Fr.) Harichaux, P. (Northern Reg. Soc. Gastroenterol., Lille, France), J. P. Capron, J. Lienard and M. Freville. *Lille Med.* 15(7):1059-1065, 1970.

997 BIOELECTRICAL ACTIVITY OF THE STOMACH AND DUODENUM AFTER CUTTING THE GASTRODUODENAL JUNCTION. (E.) Atanassova, E. (Inst. Physiol., Sofia, Bulgaria). *Izv. Inst. Fiziol. Rast. Metodi Popov* 13:211-227, 1970.

998 ON THE MECHANISM OF CORRELATION BETWEEN THE SPIKE ACTIVITIES OF THE STOMACH AND DUODENUM. (E.) Atanassova, E. I. *Izv. Inst. Fiziol. Rast. Metodi Popov* 13:229-242, 1970

999 EFFECTS OF 2-(2-CHLOROPHENYL)-2-(METHYLAMINO)CYCLOHEXANONE HYDROCHLORIDE [KETALAR] ON STOMACH AND SMALL INTESTINE MOTILITY IN DOGS. (Jap.) Mori, T. (Univ. Med. Sch. Okayama, Japan), S. Koike, H. Konishi and T. Okazaki. *Masui (Jap. J. Anesthesiol.)* 19(13): 1435-1437, 1970.

1000 ELECTROMYOGRAPHIC VIEWS ON PRESERVATION AND TRANSPLANTATION OF SMALL INTESTINE IN DOGS. (E.) Jonouchi, H. (Nihon U. Sch. Med., Tokyo). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4):270-289, 1970.

1001 RHYTHMS OF FUNDAMENTAL ELECTRIC ACTIVITY OF THE SMALL INTESTINE AND COLON. TENTATIVE ANALYSIS IN RATS. (Fr.) Thouvenot, J. (Sch. Med., Tours, France) and J. Penaud. *J. Physiol. (Paris)* 62(Suppl. 2):323-324, 1970.

1002 SLOW WAVES AND MECHANICAL ACTIVITY IN CAT COLON CIRCULAR MUSCLE. (E.) Caprilli, R. (U. Rome Med. Clin.), L. Onori, M. Tonini and G. Zapponi. *R.C. Rom. Gastroenterol.* 2(2):83-89, 1970.

1003 STIMULATORY EFFECTS OF CATECHOLAMINES ON THE ISOLATED RAT COLON AFTER BETA-ADRENERGIC BLOCKADE WITH OXPRENOLOL AND PROPRANOLO (E.) Gagnon, D. J. (U. Sherbrooke Hosp. Ctr., Canada) and S. Belisle. *Eur. J. Pharmacol.* 12(3):303-309, 1970.

1004 EFFECTS OF METOCLOPRAMIDE ON ISOLATED GUINEA-PIG COLON. 1) PERIPHERAL SENSITIZATION TO ACETYLCHOLINE. (E.) Beani, L. (U. Pisa Dept. Pharmacol., Italy), C. Bianchi and C. Crema. *Eur. J. Pharmacol.* 12(3):320-331, 1970.

1005 EFFECTS OF METOCLOPRAMIDE ON ISOLATED GUINEA-PIG COLON. 2) INTERFERENCE WITH GANGLIONIC STIMULANT DRUGS. (E.) Bianchi, C. (U. Pisa Dept. Pharmacol., Italy), L. Beani and C. Crema. *Eur. J. Pharmacol.* 12(3):332-341, 1970

1006 RECENT STUDIES OF COLONIC AND RECTAL MOTOR ACTION. (E.) Mann, C. V. (St. Mark's Hosp., London) and J. D. Hardcastle. *Dis. Colon Rectum* 13(3):225-230, 1970.

1007 GASTROINTESTINAL VAGAL MECHANORECEPTORS IN CATS. (Fr.) Mei, N. (CNRS Inst. Neurophysiol., Marseille, France). *Exp. Brain Res.* 11(5):502-514, 1970.

1008 THE HIPPOCAMPUS AND VISCERAL CONDITIONE REFLEXES. (Rus.) Sitdikova, V. V. (Pavlov Inst. Physiol., Leningrad, USSR). *Zh. Vyssh. Nerv. Deiat.* 20(6):1161-1167, 1970.

See also numbers: 1009, 1016

STOMACH

1009 EFFECT OF SENSITIZATION ON GASTRIC SECRETION AND MOTILITY. (E.) Groza, P. (D. Danielopolu Inst. Normal Pathol. Physiol., Bucharest, Rumania) and M. Corneanu. *Rev. Roum. Physiol.* 7(3):199-209, 1970.

Sensitization (induced by 5 ml horse serum injected i.m. and i.v.) in dogs induced an increase in hunger contractions and a reduction of the resting interval; anaphylactic shock further enhancing these contractions. Anaphylactic shock in dogs in the fasting state induced gastric secretion quantitatively similar to postprandial secretion with a higher pepsin content; however, shock induced postprandially inhibited gastric secretion in dogs with Pavlov pouches. Sensitization in dogs with Pavlov pouches and gastric fistulas induced gastric hypersecretion associated with a rise in pepsin levels (aftermeal secretion). In dogs with normal and completely denervated Heidenhain pouches, however, sensitization decreased gastric hypersecretion, pepsin content, and mucopolysaccharide content, indicating a gradual reduction of the precholine store due to complete absence of parasympathetic stimulus. Acetylcholine assayed in the gastric juice and blood showed an elevation in concentration whereas cholinesterase underwent opposite changes. Exogenous gastrin administered to sensitized dogs greatly increased gastric secretion, particularly in dogs with gastric fistulas and abundant vagal innervation; this hypersecretion is explained by the effect of gastrin on a hypercholinergic background. The characteristics of gastric secretion sampled from a completely denervated gastric pouch suggest the involvement of sympathetic innervation in anaphylaxis.

1010 THE EFFECT OF PARTIAL PYLORIC OBSTRUCTION ON GASTRIC SECRETION AND STOMACH SIZE IN THE RAT. (E.) Kaye, M. D. (U. Colorado Med. Ctr., Denver). *Am. J. Dig. Dis.* 16(3):217-226, 1971.

Partial pyloric obstruction with a silk ligature was performed in male albino Wistar rats; in sham operated controls, the duodenum was mobilized. All animals were then fed a standard diet. Eleven weeks after surgery, animals were sacrificed and autopsy examination revealed that rats with obstruction had significant increases in surface area, height, and volume of the pyloric and, to a far lesser extent, the fundic gastric mucosa than controls. Experimental animals had increased forestomach weight and increased volume of gastric muscle. Experimental rats showed only a slight increase in gastric acid secretion. No significant differences were seen in response to repeated large doses of pentagastrin in rats with long-standing obstruction. It is concluded that the increase in fundic mucosa was not accompanied by a proportionate increase in gastric secretory capacity.

1011 GASTRIN RESISTANCE FOLLOWING IMMUNIZATION TO THE C-TERMINAL TETRAPEPTIDE AMIDE OF GASTRIN. (E.) Jaffe, B. M. (Washington U. Sch. Med., St. Louis, Mo.), J. E. McGuigan and W. T. Newton. *Surgery* 69(2):232-237, 1971.

Female Sprague-Dawley rats were actively immunized by s.c. injection of C-terminal tetrapeptide amide of gastrin conjugated to bovine γ-globulin with water-soluble 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and emulsified with complete Freund's adjuvant. Immunization against the tetrapeptide almost completely abolished stimulation of gastric acid secretion produced by a single, rapid injection of gastrin (0.4 or 1.0 μg/kg i.v.). These doses of gastrin increased acid production 16% and 33%, resp., above the basal rate in immunized animals, and 94% and 190%, resp., above the basal rate in controls. The titer of anti-tetrapeptide antibody in the serum of each rat was more than sufficient to bind all exogenous gastrin administered. These findings suggest that immunization to gastrin tetrapeptide may be a useful method for treating patients with gastrin-mediated gastric acid hypersecretion.

1012 EFFECT OF DUODENAL TUBE ON THE GASTRIC SECRETION OF ACID AND PEPSIN IN MAN. (E.) Berstad, A. (Ulleval Hosp., Oslo, Norway) and H. Petersen. *Scand. J. Gastroenterol.* 6(1): 9-15, 1971.

Basal gastric secretion samples were collected from 11 healthy young men over a 3-hr period following insertion of a gastric Levin tube or gastroduodenal Lagerlöf tube. Results were essentially the same for both the Lagerlöf I and II procedures. Pepsin output, pepsin concentration, and pepsin:acid ratio were significantly higher with the Lagerlöf II tube than with the Levin tube. The Lagerlöf tube also showed a significant nonsteady state level of volume, acid concentration, acid output, pepsin output, and pepsin:acid ratio. The effect of the tube was independent of duodenal drainage. In 4 men studied with the Lagerlöf tube, there was no augmentation of pepsin output when the duodenum was perfused with secretin-stimulated duodenal juice.

1013 WATER MOVEMENT THROUGH CANINE STOMACH DURING THIOCYANATE INHIBITION OF GASTRIC ACID SECRETION. (E.) Moody, F. G. (U. Alabama

Med. Ctr., Birmingham). *Am. J. Physiol.* 220(2): 467-471, 1971.

Transepithalial water movement was studied in exteriorized, chambered segments of canine stomach (blood supply intact) during thiocyanate inhibition of gastric acid secretion stimulated by i.v. histamine. Thiocyanate inhibition was produced by a loading dose of 40 mEq administered over a 1-hr period followed by infusion at a rate of 0.2-0.4 mEq/min without interrupting histamine administration. Diffusion of ^{3}H-labeled water from luminal solutions of isosmotic mannitol was measured at rest and during secretion and thiocyanate inhibition. Hydrostatic conductivity (water movement in response to an imposed hydrostatic pressure of 50 cm H_2O) was also measured. Diffusional water loss during stimulation and thiocyanate inhibition was 35% greater than under resting conditions. Only a small increase in water filtration occurred during secretion and increased hydrostatic pressure, but a 4-fold decrease occurred with inhibition. A comparable restriction in water movement at the site of H^+ transport could account for the decrease in acid secretion which occurs in the presence of apparent H^+ production under these experimental conditions.

1014 Na^+ TRANSPORT AND IMPEDANCE PROPERTIES OF THE ISOLATED FROG GASTRIC MUCOSA AT DIFFERENT O_2 TENSIONS. (E.) Flemström, G. (U. Uppsala Biomed. Ctr., Sweden). *Biochim. Biophys. Acta.* 225(1):35-45, 1971.

Na^+ was actively transported from the mucosal or secretory side to the serosal (nutrient) side of isolated frog gastric mucosa at an O_2 tension of 300 mm Hg in the bath solution. The short circuit current remained unchanged although the H^+ secretion decreased when the O_2 tension was reduced from 700 to 300 mm Hg, which might be interpreted as a contribution of the active transport of Na^+ to the short circuit current. No active transport of Na^+ was observed at a high O_2 tension (700 mm Hg) and 2 lower ones (150 and 40 mm). Although no elution of L-lactate into the bath solution was detected, the appearance of 2 impedance loci at O_2 tensions of 300 mm Hg or lower apparently indicated that the frog gastric mucosa was in a somewhat hypoxic condition when actively transporting Na^+. This finding may be of importance in evaluating active transport of Na^+ in the isolated mammalian gastric mucosa, which was earlier found to have a considerable production of L-lactate, indicating tissue hypoxia. Active transport of Na^+ in the hypoxic gastric mucosa may be due to an asymmetric distribution of the sodium pump, common to most cell membranes, in the acid-secreting cells.

1015 INFLUENCE OF THE ANTRUM ON THE ACID RESPONSE TO DISTENSION OF THE BODY OF THE STOMACH IN DOGS. (E.) Preshaw, R. M. (U. Toronto Dept. Physiol., Ontario, Canada). *Can. J. Physiol. Pharmacol.* 48(10):661-669, 1970.

Distension of the body of the stomach caused an increase in acid output in dogs with innervated antral pouches; this response was inhibited by acidification or vagal denervation of the antral pouch. Vagal denervation also inhibited gastric acid output in response to sham feeding. The acid output from dogs with denervated fundic pouches was consistently low, and not related to the degree of distension of the main stomach. After antral separation, the level of acid output during both control periods and periods in which the main stomach was distended were lower than the outputs observed when the antral pouch was in continuity. Sham feeding had no stimulatory effect on the output from the denervated fundic pouch. Secretory response to distention resembles the cephalic phase of gastric secretion because it is partially dependent upon an antral mechanism. The inhibitory effects of antral acidification or antral denervation on the distension response may be attributed to interference with the basal release of gastrin by a vagal mechanism.

1016 EFFECT OF VAGOTOMY ON THE ACID RESPONSE TO GASTRIC DISTENSION. (E.) Preshaw, R. M. (U. Toronto Dept. Physiol., Ontario, Canada). *Can. J. Physiol. Pharmacol.* 48(10): 670-674, 1970.

The secretory response to gastric distension was studied in 3 conscious dogs after vagotomy. Distension of the body of the stomach caused an increase in acid output from vagally innervated antral pouches. Bilateral vagotomy caused a pronounced inhibition of acid output during gastric distension. Vagotomy had no effect on the increased antral motor activity resulting from distension, and denervation of the antral pouch caused little apparent change in the small distension response observed after vagotomy alone.

1017 EFFECT OF VAGOTOMY AND/OR ANTRECTOMY ON GASTRIC SECRETION STIMULATED BY INTRAVENOUS INFUSION OF BETHANECHOL CHLORIDE. STUDY ON RATS WITH GASTRIC FISTULA. (E.) Kowalewski, K. (U. Alberta Surg.-Med. Res. Inst., Edmonton, Canada). *Am. J. Dig. Dis.* 16(1):19-25, 1971.

Spontaneous gastric acid and pepsin secretion were studied for 24 hr in adult male Wistar rats with permanent gastric fistulas. Animals were either intact controls or had undergone bilateral vagotomy, antrectomy, or combined vagotomy and antrectomy. Bilateral vagotomy, either alone or in combination with antrectomy, completely abolished both acid and pepsin secretion while antrectomy alone increased both acid and pepsin secretion. These findings indicate that basal spontaneous gastric secretion is vagus-dependent. Infusion of the cholinergic agent, bethanechol, for 24 hr (2.5 mg/kg intra-arterially) significantly increased gastric secretion in intact rats; it completely restored pepsin secretion to normal levels and partially restored acid secretion in vagatomized animals. In antrectomized rats, bethanechol further increased acid and pepsin secretion, but it had no effect on secretion in animals which had undergone both vagotomy and antrectomy.

1018 GASTRIC ACID OUTPUT AFTER SHAM FEEDING AND DURING RELEASE OR INFUSION OF GASTRIN. (E.) Preshaw, R. M. (U. Toronto Dept. Physiol., Ontario, Canada). *Am. J. Physiol.* 219(5):1409-1416, 1970.

Peak rates of gastric acid output from a gastric fistula after sham feeding did not differ significantly from the maximal response to gastrin in dogs with an innervated antral pouch, but were greater than the maximal output observed during perfusion with acetylcholine chloride. Peak output from a denervated fundic pouch after sham feeding was not significantly greater than rates during control experiments without stimulation, and was smaller than the calculated maximal response to gastrin and acetylcholine perfusion of the antrum. In dogs with intact stomachs, resection of the antrum and proximal duodenum decreased, but did not abolish, the acid output after sham feeding. If the sham feeding response is due to interaction between gastrin and direct vagal influences, the amount of gastrin released appears small.

1019 EFFECT OF PROLONGED INTRAVENOUS OF OLEATE SODIUM ON SPONTANEOUS AND HISTAMINE STIMULATED GASTRIC SECRETION IN RATS. (E.) Kowalewski, K. (U. Alberta Surg. Med. Res. Inst., Edmonton, Canada). *Arch. Int. Physiol. Biochim.* 78(5):971-977, 1970.

Administration of sodium oleate (30 ml of 0.2 N solution mixed with 70 ml of normal saline) suppressed the volume of gastric secretion, acid output, and pepsin in nonstimulated and in histamine-stimulated rats. Sodium oleate infusion increased the concentration of both Na^+ and Cl^- in the gastric secretion, apparently because of the presence of these electrolytes in the infused solution. Sodium oleate did not alter HCl or pepsin concentration. The effect of sodium oleate on gastric secretion is apparently not dependent on the contact of this fatty acid with the duodenal mucosa, but appears to be a function of its presence in the blood stream.

1020 ACTION OF GLUCAGON ON HISTAMINE-INDUCED GASTRIC ACID SECRETION IN DOGS AND RATS. (E.) Lin, T. M. (Lilly Res. Labs., Indianapolis, Ind.), D. C. Evans, G. F. Spray and D. N. Benslay. *Arch. Int. Pharmacodyn. Ther.* 188(2):332-340, 1970.

In dogs with Heidenhain pouches, the effect of glucagon on gastric acid secretion was studied to clarify the conditions under which it inhibits histamine-induced acid secretion. A single injection of glucagon (50 µg/kg) significantly decreased the secretory rate when it was less than 30% of the maximal output; this inhibition was primarily a reduction in volume output. When the histamine dose was 24-48 µg/kg/hr and the secretory rate was 60% of the maximum, glucagon was ineffective in depressing acid secretion. When the histamine dose was 6-8 µg/kg/hr, dogs with double gastric pouches exhibited an inhibition of acid output whether their vagus nerves were intact or not. Glucagon was effective in inhibiting basal and histamine-induced acid secretion in the rat.

1021 DETECTION AND POSSIBLE ROLE OF A CHAIN METHYLATED HISTAMINE METABOLITE(S) IN GUINEA-PIG STOMACH. (E.) Kovacs, E. M. (McGill U. Dept. Pharmacol. Therapeut., Montreal, Quebec, Canada) and S. Heisler. *Eur. J. Pharmacol.* 11(3):349-360, 1970.

N-Methylhistamine and N,N-dimethylhistamine, (0.17 mg/kg, s.c.), 2 biologically active chain-methylated histamine analogues, produced a higher acid output in pylorus-ligated guinea pigs than histamine (0.4 mg/kg). One or more chain-methylated histamine metabolites were detected in the stomachs of guinea pigs pretreated with cortisone and aminoguanidine. While the methylation of histamine was inhibited by the administration of chlorpromazine, cortisone-induced formation of chain-methylated metabolites was inhibited. In studies with labeled histamine (20 µc/kg, intracardially), cortisone decreased the ratio of ^{14}C-histamine:total ^{14}C-methylhistamine, indicating that methylation occurred to a greater extent in the stomachs of cortisone-pretreated guinea pigs than in the stomachs of controls. Cortisone treatment might increase the formation of a chain-methylated metabolite by enhancing the activity of the methylating enzyme system. The acid hypersecretory effect of cortisone in guinea pigs may be due to the increased formation of this active histamine metabolite, which may be involved in peptic ulceration, a clinically important side effect of prolonged glucocorticoid therapy.

1022 EFFECT OF ILEAL EXCLUSION ON THE HEIDENHAIN POUCH ACID RESPONSE TO HISTAMINE IN DOGS. (E.) Saik, R. P. (U. Pennsylvania Sch. Med., Philadelphia), E. M. Copeland, L. D. Miller and G. P. Smith. *Ann. Surg.* 173(1):67-77, 1971.

Ileal exclusion produced an increase ranging from 78.3 to 175.6% in the 24 hr acid output in

5 of 6 dogs. Two dogs with only 3 feet of bowel excluded showed no potentiation of their histamine curves at any dose level even after additional bowel was excluded. All of the other 5 dogs demonstrated potentiation of the maximal histamine response and of most of the submaximal responses; more potentiation occurred with longer intervals post-exclusion. Acid perfusion of the isolated ileal fistula gave variable results causing a significant decrease in 2 of 3 dogs at the submaximal levels, and a decrease in the maximal histamine response in only 1 dog. Perfusion with a micellar fat mixture caused a more reproducible inhibition of the maximal histamine response in 2 of 3 dogs and an inhibition at some point in the histamine curve in all dogs. Antrectomy produced similar effects as seen following fat perfusion. Exclusion of the distal ileum from the fecal stream apparently causes potentiation of the maximal histamine response of a Heidenhain pouch, and could remove inhibitory factors normally acting on the gastrin mechanism or on the parietal cell directly.

1023 GASTRIC SECRETION OF IODIDE RELATED TO ADRENOCORTICAL ACTIVITY. AN EXPERIMENTAL STUDY IN THE PYLORUS-LIGATED RAT. (E.) Arnthorsson, G. (Univ. Hosp., Uppsala, Sweden), L. Johnson, G. Nylander and S. Wikström. *Scand. J. Gastroenterol.* 6(1):59-63, 1971.

Gastric secretion of HCl or iodide (after i.v. injection of 2 μC $Na^{131}I$), during the 6-hr period after pyloric ligation, in rats with intact adrenal glands was not altered by s.c. administration of either cortisone acetate, desoxycorticosterone acetate, or prednisolone (in doses of 10 mg, 2.5 mg, and 2.5 mg, resp., on each of 3 days before analysis). A significant decrease in acidity, total volume, and iodide content was found in the gastric contents of previously adrenalectomized rats. All 3 parameters returned to normal by 14 days after adrenalectomy. Total iodide secretion varied directly with the volume of gastric contents, but was not related to gastric pH.

1024 GASTRIC SECRETION OF MUCUS RELATED TO ADRENOCORTICAL ACTIVITY. A HISTOCHEMICAL STUDY IN THE RAT. (E.) Arnthorsson, G. (Univ. Hosp., Uppsala, Sweden), L. Johnson, G. Nylander and S. Wikström. *Scand. J. Gastroenterol.* 6(1): 65-70, 1971.

The mucus layer of the stomach was studied in adrenalectomized and sham-adrenalectomized rats with and without the s.c. admin. of cortisone acetate (10 mg/day), desoxycorticosterone acetate (2.5 mg/day), or prednisolone (2.5 mg/day) for 3 successive days before analysis. Increased production of mucous material was seen in adrenalectomized rats, and this was maximal 14 days after adrenalectomy. Reduction of mucosal mucin to control levels was seen after administration of prednisolone and, to a lesser extent, cortisone acetate to both adrenalectomized and intact rats; this effect was not seen with desoxycorticosterone acetate.

1025 GASTRIC ANALYSIS WITH ORAL STIMULI. A COMPARATIVE STUDY WITH MAXIMAL BETAZOLE STIMULATION. (E.) Wenger, J. (VA Hosp., Atlanta, Ga.), F. E. Oliver, A. Jones and M. Sundy. *Am. J. Dig. Dis.* 16(2):151-155, 1971.

Eighteen men (4 with duodenal ulcer, 5 with deformity of the duodenal bulb, and 9 with other gastrointestinal disorders) were tested both with a standard s.c. injection of 1.5 mg/kg betazole and with a p.o. dose of 1.5 mg/kg betazole plus 5 mg bethanechol. Gastric analysis revealed no significant differences between the 2 test regimens with respect to peak volume output, peak acid output, or peak pepsin output. Blurred vision, severe dizziness, and tachycardia developed after the s.c. dose in 1 patient, but this was not seen with the p.o. dose 6 days later; another patient, who experienced dizziness and headache after the s.c. dose, did not experience this the next day with the p.o. dose. With the p.o. dose, most of the patients experienced flushing of the face, but only 1 developed a mild headache. Three men had abdominal distress associated with the appearance of bloodtinged gastric contents after gastric stimulation.

1026 COMPARISON OF DOSE-RESPONSE RELATIONS OF INSULIN AND 2-DEOXY-D-GLUCOSE FOR BILIARY AND GASTRIC ACID SECRETION IN DOGS. (E.) Jones, R. S. (VA Hosp., San Francisco. Calif.), R. E. Geist and A. D. Hall. *Gastroenterology* 59(5):665-670, 1970.

Hepatic bile flow and gastric acid secretion were measured in mongrel dogs subjected to cholecystectomy and ligation of the lesser pancreatic duct with one Thomas cannula inserted into the duodenum opposite the opening of the common bile duct and another inserted into the stomach. Graded doses of insulin (0.03-2.0 U/kg i.v.) or 2-deoxy-D-glucose (50-400 mg/kg i.v.) were administered during i.v. infusion of 0.5% sodium taurocholate. Even the lowest doses of insulin and 2-deoxy-D-glucose increased bile flow. With insulin the maximum bile flow was 4.5 mg/15 min after 1 U/kg while the maximum acid output was 9.0 mEq/15 min after 0.5 U/kg. For 2-deoxy-D-glucose the maximum bile flow was 3.7 ml/15 min and the maximum acid output was 8.4 mEq/15 min, both after 200 mg/kg. Differences between maximum bile flow or gastric acid output produced by insulin and those produced by 2-deoxy-D-glucose were not significant. When responses were expressed as percentages of the maximum response, submaximal doses of insulin produced greater increases in bile flow than in acid output. Results of duodenal pH studies indicate that gastric acid is prevented from entering the duodenum with an open gastric fistula.

1027 COMPARISON OF ACTIONS OF AMINOPHYLLINE AND PENTAGASTRIN ON Necturus GASTRIC MUCOSA. (E.) Nakajima, S. (U. Alabama Med. Ctr., Birmingham), R. L. Shoemaker, B. I. Hirschowitz and G. Sachs. *Am. J. Physiol.* 219(5):1259-1262, 1970.

Aminophylline provoked near maximal sustained H^+ secretion with a fall in transmucosal electrical potential difference and resistance at high concentrations, a transient slight increase in transmucosal potential difference, and a decrease in resistance at smaller concentrations in studies of isolated Necturus gastric mucosa. Imidazole produced a significant reduction of H^+ response to aminophylline, and N-2'-O-dibutyryl cyclic 3',5'-AMP mimicked the effects of small concentrations of aminophylline. Pentagastrin elicited H^+ secretion with an increase in transmucosal potential difference and a decrease in resistance; pretreatment with atropine blocked the pentagastrin response. Imidazole significantly reduced H^+ response to N-2'-O-dibutyryl cyclic 3',5'-AMP but had no effect on the response to pentagastrin. The dibutyryl AMP derivative may be a critical intermediary in the action of methyl xanthine on the parietal cells, and the mechanism by which pentagastrin stimulates the parietal cells is apparently different from that involving methyl xanthine.

1028 THE EFFECT OF ATROPINE ON PLASMA GASTRIN RESPONSE TO FEEDING. (E.) Walsh, J. H., R. S. Yalow (VA Hosp., Bronx, N. Y.) and S. A. Berson. *Gastroenterology* 60(1):16-21, 1971.

After a test meal (16 g protein, 13 g fat, and 36 g carbohydrate), plasma gastrin levels increased in 5 controls and 3 men with duodenal ulcers. This was also observed 1 month later when all subjects received a single i.m. dose of 1.0 mg atropine sulfate 30 min before the test meal. Over the 2-hr period after the test meal, integrated increments in plasma gastrin response were always more marked after atropine, and these differences were most evident in the 3 men with duodenal ulcers. During a 2-hr fasting period after administration of atropine, no changes were noted in 1 patient with pernicious anemia and high fasting plasma gastrin concentration. It is concluded that atropine fails to inhibit the gastrin-secretory response to a test meal and may even increase the response.

1029 ACTION OF CAERULEIN ON GASTRIC SECRETION IN MAN. (E.) Agosti, A., S. Biasioli and G. Bertaccini (Maggiore Hosp., Parma, Italy). *Gastroenterology* 59(5):727-730, 1970.

In 47 healthy males aged 24-65 yr, the threshold stimulant dose of cerulein was 0.05-0.10 µg/kg i.m., and the maximum dose tolerated with no side effects was 0.75 µg/kg. Within 10-15 min after injection of 1 µg/kg, 5 of 7 subjects developed facial flush, mild tachycardia, sweating, and nausea which lasted approximately 15 min. The peak 15-min acid output following administration of 0.5 µg/kg of cerulein was about 1/2 that obtained with 6 µg/kg of pentagastrin. Differences in peak acid concentrations after cerulein and pentagastrin are due mainly to differences in volume of secretion. In man, cerulein is a partial antagonist in stimulating gastric secretion and may be used as an antagonist of the secretion elicited by pentagastrin.

1030 EFFECT OF CAERULEIN ON PEPTIC SECRETION OF THE RAT. (E.) Mantovani, P. (U. Parma Inst. Pharmacol., Italy). *Arzneim. Forsch.* 20(10):1588-1590, 1970.

In vitro and in situ studies of the effect of cerulein on pepsin secretion in the rat were performed to further elucidate the mode of action of the peptide. The threshold for cerulein stimulation of pepsin secretion was 0.25-0.50 µg/kg when injected s.c., and 25-50 ng/kg when injected i.v. When 5 µg/kg cerulein was administered, secretion was more than 100% greater than basal levels. With doses up to 10 times higher than threshold levels, a good dose-response relationship was observed. Cerulein seemed to be more active than gastrin I, pentagastrin, insulin, histamine, or carbachol.

1031 ANTI-INFLAMMATORY DRUGS AND GASTRIC MUCUS. (E.) Johansson, H. (U. Uppsala Dept. Surg., Sweden) and B. Lindquist. *Scand. J. Gastroenterol.* 6(1):50-54, 1971.

Histochemical examination of gastric mucus was performed in Sprague-Dawley rats that received aqueous solutions or suspensions of calcium acetylsalicylate, p-hydroxyphenylbutazone, or indomethacin by way of a nasogastric tube or by direct instillation into the duodenum. In some animals, serum from aortic blood and gastric secretion were examined for levels of salicylate or indomethacin. Salicylate passed from the systemic circulation into the stomach and, after pyloric ligation, from the stomach into the circulation; passage in neither direction was observed with indomethacin. Compared to the effect of water in controls, all 3 experimental agents reduced the mucus layer in the stomach, and this effect was greatest with salicylate. It is concluded that the mucus-reducing effect of these agents is mediated both locally and systemically.

1032 POTENCY OF COMPOUND 247 (ETHRANE) IN INHIBITION OF FROG GASTRIC SECRETION. (E.) Schwartz, M. (U. Louisville Dept. Physics, Ky.) and T. N. MacKrell. *Proc. Soc. Exp. Biol. Med.* 136(1):92-94, 1971.

Ethrane (an inhalation agent administered at 7.5%) decreased the gastric H^+ secretory rate and markedly increased transmucosal resistance. Relative potencies of methoxyflurane, chloroform, halothane, ethrane, and fluoroxene for decreasing H^+ secretion were given; ethrane was next to last in relative potency. Apparently, the ratio of anesthetic required to produce a given percentage decrease in H^+ secretory rate to the minimum anesthetic concentration required in man to prevent a muscular response to a skin incision in 50% of anesthetized subjects is essentially a constant for volatile anesthetics.

1033 PREPARATION AND ASSAY OF UROGASTRONE, AN INHIBITOR OF GASTRIC ACID SECRETION. (E.) Lawrence, A. J. (U. Glasgow Dept. Cell. Biol., Scotland), H. O. Schild and G. M. Smith. *Br. J. Pharmacol.* 41(1):8-18, 1971.

Gastric acid secretion in response to carbachol and the inhibition of carbachol-induced secretion by urogastrone were used to study urogastrone levels in perfused rat stomach preparations through which a succinic-propionic buffer was circulated. The assay technique described required the administration of only 1 or 2 doses of urogastrone to each animal. Urogastrone was extracted and isolated from human urine using zeocarb (a cationic polystyrene resin) extraction, rotary evaporation, and gel filtration with Sephadex G 50. After gel filtration (the last step) the preparations seemed less toxic than previously determined, and the specific activity had increased to a maximum of 80 U/mg which was 40-80 times the least detectable level using this assay method.

1034 CHYLOGASTRONE: GASTRIC SECRETORY INHIBITOR IN THORACIC DUCT LYMPH OF MAN AND DOG. (E.) Rosenthal, W. S. (New York Med. Coll., N. Y.) and J. Rudick. *Am. J. Physiol.* 220(2):452-456, 1971.

Partially purified chylogastrone, a potent inhibitor of gastric acid secretion, was obtained from thoracic duct lymph taken during fasting from 2 human and 6 canine subjects. It was separated by chloroform-methanol extraction of cell-free lymph followed by gel filtration of the material recovered at the aqueous-nonpolar interface. The active fraction was consistently the last retarded peak of the eluate. In the pylorus-ligated rat, the mean dose producing 50% inhibition of acid output was 1.04 mg/kg/rat with human lymph and 1.24 mg/kg/rat with canine lymph. This material did not cross-react immunologically with antisera to normal canine or human serum proteins. Pepsin secretion was decreased, but this was related to the decreased volume of secretion. Chylogastrone was not found in lymph obtained from 3 dogs after feeding. The presence of an inhibitor of gastric acid secretion during fasting, that could not be demonstrated after feeding, suggests a possible physiological role for this substance in the regulation of gastric secretion.

1035 EFFECT OF TREATED AND UNTREATED COFFEE ON GASTRIC ACID SECRETION. (Ger.) Rösner, P. (Langenberg/Rheinland Hosp., Germany), F. Keiner and U. Kühn. *Med. Klin.* 66(7):238-242, 1971.

Gastric acidity was measured by the Gastracid Test in 22 hospital patients after ingestion of 250 ml of untreated coffee or coffee which had been treated to remove much of the 5-hydroxytryptamides of carboxylic acids. Statistical analysis of the results showed that gastric acidity was lower in 4 of 5 coffee drinkers who drank the treated coffee. It is suggested that the 5-hydroxytryptamides of carboxylic acids are converted into serotonin by chromaffin cells in the intestinal mucosa, and that serotonin may be responsible for symptoms which some individuals develop after drinking coffee.

1036 LIPOLYTIC ACTIVITY OF HUMAN GASTRIC AND DUODENAL JUICE AGAINST MEDIUM AND LONG CHAIN TRIGLYCERIDES. (E.) Cohen, M., R. G. H. Morgan and A. F. Hofmann (Mayo Clin., Rochester, Minn.). *Gastroenterology* 60(1):1-15, 1971.

In 73 patients undergoing gastric analysis, gastric aspirates, which were 97% free of duodenal reflux, showed evidence of lipase activity. In contrast to lipase activity present in duodenal aspirates, this enzyme was stable at pH 2, had a lower pH optimum, showed a marked and rapid decrease in activity in the presence of bile acid, underwent moderate inhibition of activity when fatty acids were added, had a smaller apparent molecular weight (about 50,000 compared to more than 500,000) by gel filtration chromatography, and had only moderate esterifying properties. Like duodenal enzymes, the gastric enzyme had greater activity against short-chain than against long-chain triglycerides, and was more active against fatty acid according to isomerization of the triglycerides. Gastric lipase cleaved synthetic triglycerides more slowly than did pancreatic lipase from pancreatic fistula juice or from duodenal aspirates. Human milk triglycerides were cleaved by gastric and duodenal lipases, but not by lipase in pancreatic fistula juice which lacked bile acid. In healthy adults, the gastric concentration of gastric lipase was much less than the duodenal concentration of pancreatic lipase. Gastric concentration of gastric lipase was significantly reduced in 3 patients with achlorhydria. It is concluded that gastric lipase aids in digestion of milk triglyceride in infants as well as in the hydrolysis of exogenous medium-chain triglycerides, especially in children with decreased concentrations of pancreatic lipase. It seems to have little importance in normal fat digestion in adults.

1037 GASTROINTESTINAL HORMONES. I. GASTRIN AND SECRETIN. (Rev.) (Fr.) Vagne, M. (Edouard Herriot Hosp., Lyon, France). *Pathol. Biol. (Paris)* 18(19-20):887-904, 1970.

1038 GASTRIN: BIOCHEMISTRY, PHYSIOLOGY, CLINICAL SIGNIFICANCE. (Rev.) (Rus.) Bassalyk, L. S. *Ter. Arkh.* 42(12):4-9, 1970.

1039 ELECTRON MICROSCOPIC STUDY OF CHOLINE GRANULES IN THE GASTRIC GLANDS. (Jap.) Hiraki, Y. (Yamaguchi U. Sch. Med., Ube, Japan). *Igaku Kenkyu (Acta Med. Fukuoka)* 40(1):50-58, 1970.

1040 EFFECT OF HISTAMINE, CARBACHOL, PENTAGASTRIN, AND GASTRIN EXTRACTS FROM CHICKENS ON GASTRIC ACID SECRETION IN NONANESTHETIZED CHICKENS. (Ger.) Ruoff, H. J. (U. Tubingen Pharmacol. Inst., Germany) and K. F. Sewing. *Naunyn Schmiedebergs Arch. Pharmakol.* 266(4-5): 435-436, 1970.

1041 HISTAMINE RELEASE IN MAN CAUSED BY PROPANIDID [EPONTOL], POLYGELINE [HEMACEL], HISTALOG, PENTAGASTRIN AND INSULIN. (Ger.) Lorenz, W. (U. Munich Inst. Clin. Chem., Germany), A. Doenicke, G. Feifel and K. Messmer. *Naunyn Schmiedebergs Arch Pharmakol.* 266(4-5):396-397, 1970.

1042 EFFECT OF ALDOSTERONE ON GASTRIC SECRETION IN RATS. (E.) Groza, P. (D. Danielopolul Inst. Normal Pathol. Physiol., Bucharest, Rumania) and S. Ionescu. *Rev. Roum. Physiol.* 7(2):107-112, 1970.

1043 EFFECT OF SOME MINERAL SALTS AND CONDIMENTS ON ABOMASUM SECRETION IN SHEEP. (Pol.) Pytasz, M. (High Sch. Agric. Vet. Fac., Lublin, Poland), M. Wislinski and T. Studzinski. *Med. Wet.* 26(9):566-570, 1970.

1044 EFFECT OF ACETYLSALICYLATE ON GASTRIC MUCOSA. A HISTOCHEMICAL STUDY OF GASTRIC MUCUS IN RATS. (Sw.) Lindquist, B. (U. Uppsala Surg. Clin., Sweden). *Nord. Med.* 85(3):74-77, 1971.

1045 IMMUNOCHEMICAL STUDIES ON BLOOD GROUPS. XLVI. OLIGOSACCHARIDES ISOLATED AFTER HYDROLYSIS OF HOG GASTRIC MUCIN BLOOD GROUP A + H SUBSTANCE PREVIOUSLY TREATED WITH THE BLOOD GROUP de-N-ACETYLATING ENZYME. (E.) Etzler, M. E. (U. California Dept. Biochem. Biophys., Davis), B. Anderson, S. Beychok, F. Gruezo, K. O. Lloyd, N. G. Richardson and E. A. Kabat. *Arch. Biochem. Biophys.* 141(2):588-601, 1970.

1046 EFFECTS OF HISTAMINE AND HYDROCORTISONE ON METABOLIC ACTIVITY OF THE GASTRIC MUCOSA. (Fr.) Stoicescu, C. (Brincovenesc Hosp., Bucharest, Rumania), V. Prodescu and R. Ioanidi. *Lyon Chir.* 66(6):435-437, 1970.

1047 UNSTIRRED LAYERS IN TISSUE RESPIRATION: APPLICATION TO STUDIES OF FROG GASTRIC MUCOSA. (E.) Kidder, G. W., III (Wesleyan U. Biol. Dept., Middletown, Conn.). *Am. J. Physiol.* 219(6):1789-1795, 1970.

1048 EFFECT OF HISTAMINE AND GASTRIN ON THE "Na^+-H^+ EXCHANGE PUMP" IN ISOLATED CANINE GASTRIC MUCOSA. (Jap.) Kitahara, S. (Kumamoto U. Med. Sch., Japan) and C. A. M. Hogben. *Nippon Seirigaku Zasshi (J. Physiol. Soc. Jap.)* 32(7):437, 1970.

See also numbers: 918, 1060

PANCREAS

1049 ELECTROPHORETIC ANALYSIS OF TWENTY-FOUR SPECIMENS OF HUMAN PANCREATIC JUICE. (E.) Robinson, L. A. (U. Washington Sch. Med., Seattle), C. L. Churchill and T. T. White. *Biochim. Biophys. Acta* 222(2):390-395, 1970.

Electrophoresis in cellulose acetate strips was used to separate proteins in samples of pancreatic juice obtained from 24 patients either by direct aspiration from a dilated pancreatic duct during surgery, or after surgery from a drainage tube inserted into the pancreatic duct. In order of increasing mobility, samples contained lipase, 1-3 amylases, 1 or 2 ribonucleases, a trypsin inhibitor, 1 or 2 procarboxypeptidases, and/or 1 or 2 active carboxypeptidases, depending upon the state of preservation of the sample. Other components included another trypsin inhibitor with the same electrophoretic mobility as the most mobile of the procarboxypeptidases, a trypsinogen, a chymotrypsinogen, a second ribonuclease, and a second trypsinogen. Although the enzyme pattern was consistent in all samples, there was considerable variation in the activities of the different enzymes. In 7 of 12 patients who had acute pancreatitis before surgery, an intense band was present which was identified as serum albumin. None of the other serum proteins were found in any of these samples.

1050 INVESTIGATIONS ON THE ORIGIN OF AMYLASE IN SERUM AND URINE.

(E.) Nothman, M. M. (New England Med. Ctr. Hosps., Boston, Mass.) and A. D. Callow. *Gastroenterology* 60(1):82-89, 1971.

Because values for serum and urinary amylase do not change after subtotal pancreatectomy in man and after complete removal of the pancreas in dogs, serum amylase and urinary amylase cannot be of pancreatic origin under normal conditions. In experimental studies with dogs, when the pancreatic ducts were ligated these enzymes became markedly increased; they were further increased following secretin administration, and fell to original values when the pancreas was removed after duct ligation or following the establishment of a pancreatic fistula after duct ligation. Administration of secretin following fistula establishment did not affect the amylase values; however, the amount of amylase secreted through the fistula was increased. Following an initial increase, amylase values in serum of hepatectomized dogs and dogs with simultaneous hepatectomy and pancreatectomy fell to levels markedly below prehepatectomy levels. When the liver was removed after the dogs had sufficiently recovered from the pancreatectomy, serum amylase values were significantly decreased. Amylase regularly present in serum and urine is apparently not of pancreatic origin, and may be of hepatic origin. Only those elevated amounts of amylase which appear in the urine and blood under pathological conditions are derived from the pancreas.

1051 STUDIES OF AN ANIONIC TRYPSINOGEN AND ITS ACTIVE ENZYME FROM PORCINE PANCREAS.

(E.) Voytek, P. (Yale U. Sch. Med., New Haven, Conn.) and E. C. Gjessing. *J. Biol. Chem.* 246(2):508-516, 1971.

An anionic trypsinogen, present in large amounts and accounting for about half of the total potential trypsin activity, was identified and isolated from porcine pancreatic tissue and juice extracts. Although anionic and cationic trypsinogen show similar specificities toward synthetic trypsin substrates and proteins, they are quite different in isoelectric point as measured by their behavior on diethylaminoethylcellulose and zone electrophoresis. Like cationic trypsinogen, anionic trypsinogen is autocatalytically converted to an active enzyme. In addition, in the activation process an acid peptide fragment is apparently removed from the trypsinogen, yielding an enzyme which is less anionic than the zymogen. Soybean trypsin inhibitor and diisopropyl fluorophosphate were potent inhibitors of anionic trypsin. Anionic trypsin may play a more important role than cationic trypsin in initating activation of proteolytic zymogens in the intestine.

1052 LIPID SOLUBLE WEAK ORGANIC ACID BUFFERS AS "SUBSTRATE" FOR PANCREATIC SECRETION.

(E.) Schulz, I. (Max Planck Inst. Biophys., Frankfurt a. M., Germany), F. Strӧver and K. J. Ullrich. *Pfluegers Arch.* 323(2):121-140, 1971.

Secretory rate, pH values, and chloride ion and total buffer concentrations in the secretion were measured in isolated cat pancreas which was perfused with a Krebs-Henseleit solution containing different concentrations of sulfamerazine buffer. When sulfamerazine (7 mM/liter) was in the perfusate, the flow rate of the pancreatic fluid increased approximately 5-fold. Sulfamerazine concentration in the secretory fluid reached a value of 20 mM/liter, 3 times greater than the concentration in the perfusion fluid. The pH of the secretory fluid increased from 7.4 to 7.95 when perfused with sulfamerazine. The secretory rate dropped to very small values when the bicarbonate buffer was omitted from the perfusate, and the above sulfamerazine addition partly replaced the CO_2-bicarbonate buffer in promoting water and solute secretion. The total sulfamerazine buffer concentration in the secretion depended on the concentration of the undissociated buffer form in the perfusate. At the luminal cell border, a separation of H^+ and OH^- ions apparently occurs, and the undissociated form of sulfamerazine penetrates the cell by nonionic diffusion. Hence, a source of H^+ ions usable fkr H^+ transport or for buffering OH^- ions is provided. When sulfamerazine is used, the process of nonionic diffusion seems to be rate limiting for the buffer secretion.

1053 EFFECTS OF PROSTAGLANDIN E_1 ON PANCREATIC EXOCRINE FUNCTION.

(E.) Rudick, J. (Mt. Sinai Sch. Med., New York, N. Y.), M. Gonda, D. A. Dreiling and H. D. Janowitz. *Gastroenterology* 60(2):272-278, 1971.

Prostaglandin E_1, was administered in single doses (0.5-50 µg/kg/min, i.v.) to 5 dogs with chronic duodenal fistulas, with the pancreas in the resting state or secreting in response to secretin or secretin plus pancreozymin. Prostaglandin E, in single and continuous injections depressed volume flow and bicarbonate concentration in the secretin-stimulated gland and in the resting gland. Marked stimulation of protein concentration and output occurred despite the reduction in volume response. The maximal enzyme output for all doses of Prostaglandin E_1 was greater when pancreozymin plus secretin were infused than when secretin was given alone. Minimal side effects were noted with lower doses, while vomiting was associated with higher levels (greater than 10 µg/kg). Prostaglandin E1 apparently has a dual effect on the pancreas: inhibition of volume and electrolytes and stimulation of enzyme synthesis. However, the physiological role of prostaglandin E1 in the regulation of pancreatic exocrine function is unknown.

1054 PANCREATIC DOSE RESPONSE TO SYNTHETIC SECRETIN AND INTRADUODENAL ACID IN DOGS.

(E.) Konturek, S. J. (Med. Acad. Dept. Physiol., Cracow, Poland), J. Tasler and W. Obtulowicz. *Am. J. Dig. Dis.* 15(11):987-991, 1970.

Pancreatic output and bicarbonate and chloride secretion were measured in 6 dogs with chronic pancreatic fistulas during infusion of graded doses of synthetic secretin (0.125-2.0 µg/kg/hr i.v.) or during intraduodenal infusion of 0.1 N HCl. Almost identical dose-response curves were obtained when successively larger doses of secretin were administered on the same day or when single doses were given on separate days. A dose of 2.0 µg/kg/hr of secretin produced the highest mean output (47.0 ml/30 min) and the highest mean bicarbonate output (6.31 mEq/30 min). Pancreatic output and bicarbonate secretion were closely related to the rate of acid infusion. When acid was infused into the duodenum at different rates (1-16 mEq/hr), maximum response was obtained with 8 mEq/hr, no matter whether successively faster rates were infused on the same day or single tests were run on separate days. When acid was infused at successively faster rates on the same day, the mean pancreatic output and bicarbonate output were about 10% lower than those produced by the largest dose of secretin. When 8 mEq/hr was infused on a single day, pancreatic response to acid was equal to the response to secretin. Pancreatic chloride secretion decreased with increasing rates of acid infusion, reaching its lowest level when acid was infused at a rate of 4-16 mEq/hr. This is similar to the response obtained with synthetic secretin.

1055 LOCALIZATION OF SECRETIN RELEASE BY ACID IN SMALL INTESTINE OF THE DOG.

(E.) Konturek, S. J. (Med. Acad. Inst. Physiol., Cracow, Poland), J. Tasler and W. Obtulowicz. *Am. J. Physiol.* 220(1):124-127, 1971.

Pancreatic secretion was studied in chronic pancreatic fistula dogs with intestinal Thiry loops fashioned from various parts of the small intestine. The mean highest pancreatic flow rate and bicarbonate output obtained with secretin were only about 10% higher than the maximal pancreatic responses achieved by the introduction of acid into the duodenum and about 35% higher in the jejunum. Acid perfusion of an isolated duodenojejunal loop (25 cm) produced a pancreatic response of about 33% of the highest response to exogenous secretin; acidification of proximal and distal jejunal loop resulted in a response of about 10% of the highest response to secretin. No change in volume flow or bicarbonate secretion occurred in any test with irrigation of the ileal loop. The rate of secretin release stimulated by acid in the intestine seems to be determined by 2 factors: the level of intestine acidified and the intensity of the acidification at any given level of the intestine. The secretin releasing mechanism sensitive to the action of hydrogen ions is apparently widely distributed in the intestine; largest amounts of secretin are detectable in the duodenum and upper jejunum.

1056 INTRACELLULAR STORAGE OF EXPORTABLE PROTEIN IN FUNCTIONALLY HYPERTROPHIED PANCREAS.

(E.) Rothman, S. S. (Harvard Med. Sch., Boston, Mass.). *Am. J. Physiol.* 219(6): 1652-1657, 1970.

The subcellular distribution of trypsinogen, chymotrypsinogen, and amylase was studied by differential centrifugation in the pancreas of normal adult male rats and in the hypertrophied pancreas of rats fed a diet containing 4% egg-white trypsin inhibitor. Tissue concentrations of all 3 enzymes were significantly higher in the pancreas of rats given egg white. The total activity of these enzymes in the zymogen granule fraction was unchanged, indicating that none of the increased activity resulted from additional sequestration of transportable protein in the zymogen granules. Between 80 and 100% of the non-nuclear increase in tissue enzyme activity was recovered in the postmicrosomal supernatant, probably because of increased intracellular enzyme storage. However, it could not be definitely determined whether increased storage occurs in extra- or intracisternal cytoplasm. If enzymes were stored in intracisternal cytoplasm, this increased storage was accompanied by a decrease in the capacity or affinity of reticular membranes or ribosomes to bind digestive enzymes.

1057 THE INTERACTION OF ETHANOL, DIETARY LIPIDS, AND PROTEINS ON THE RAT PANCREAS. I. PANCREATIC ENZYMES.

(E.) Sarles, H. (INSERM Dig. Pathol. Unit, Marseille, France), C. Figarella and F. Clemente. *Digestion* 4(1):13-22, 1971.

The effect of ethanol on the levels of pancreatic enzymes was studied in Wistar rats fed diets with various lipid:protein ratios. When rats were fed a low 5-6% protein diet and 20% ethanol, the levels of amylase, chymotrypsinogen, trypsinogen, and lipase in the pancreas were somewhat reduced, but they were significantly reduced as the lipid content increased. On a high 17-18% protein diet, the action of alcohol was again dependent on lipid content. With a 35% lipid diet, levels of pancreatic enzymes increased; and with a 10% lipid diet, a significant reduction of amylase due to ethanol was seen. With a high-protein, low-lipid diet on a long-term basis, a moderate reduction of enzymes due to ethanol, especially significant for chymotrypsinogen, was found. It is indicated that in a normal protein diet the effect of ethanol in increasing enzyme content is due only to high lipid content in the diet; and, with a low protein, high-fat diet, the enzyme content is reduced, although moderately. These results do not support the theory that ethanol and a high-fat diet produce pancreatic damage, although chronic calcifying pancreatitis is possibly attributable to increased enzyme concentration in the zymogen granules.

1058 THE INTERACTION OF ETHANOL, DIETARY LIPIDS, AND PROTEINS ON THE RAT PANCREAS. II. ULTRASTRUCTURAL STUDY. (E.) Tasso, F. (INSERM Dig. Pathol. Unit., Marseille, France), J. Clop and H. Sarles. *Digestion* 4(1):23-24, 1971.

Cellular alterations induced in the exocrine pancreas by diets combining ethanol and different levels of dietary lipids and proteins were studied in Wistar rats, and the results were subjected to an analysis of variance. When 20% ethanol was given with a normal diet, there was a decrease in the number of zymogen granules and the number and size of mitochondria; an increase in the occurrence of lipid droplets and dense bodies was seen. An ethanol and low protein (6%) diet diminished the number and the size of mitochondria, the mean nuclear diameter, and the cytoplasmic area. Protein deficiency reduced the number of zymogen granules, the number and size of mitochondria, the mean nuclear diameter and the cytoplasmic area. Dense bodies and lipid droplets were significantly increased. A high lipid (60%) diet decreased the number of zymogen granules and the cellular size, while lipid droplets were more numerous. It is concluded that the dietary protein level is the most important factor in nutritional studies, with some reinforcing effects due to ethanol and a high lipid diet.

1059 CONDENSING VACUOLE CONVERSION AND ZYMOGEN GRANULE DISCHARGE IN PANCREATIC EXOCRINE CELLS: METABOLIC STUDIES. (E.) Jamieson, J. D. (Rockefeller U., New York, N. Y.) and G. E. Palade. *J. Cell Biol.* 48(3):503-522, 1971.

Metabolic requirements for the conversion of condensing vacuoles into zymogen granules and for the discharge of the contents of zymogen granules were studied by pulse-labeling guinea pig pancreatic slices for 4 min with ^{3}H-leucine, and incubating them in chase medium for 20 min to allow labeled proteins to reach condensing vacuoles. Tissues were then incubated for 60 min with glycolytic and respiratory inhibitors to enable the labeled proteins to reach granules. A large proportion of prelabeled condensing vacuoles underwent conversion in the presence of the combined inhibitors. Condensation may result from the aggregation of secretory proteins in an osmotically inactive form. Discharge induced by carbachol or pancreozymin was not affected if protein synthesis was blocked by cycloheximide for up to 2 hr, but was strictly dependent on respiration. Transport and discharge seemingly do not require the synthesis of secretory or nonsecretory proteins, suggesting that the cell may utilize its membranes during the secretory process.

1060 SIGNIFICANCE OF PANCREATIC FUNCTION IN EVALUATING DIGESTIVE FUNCTION. SECOND REPORT ON THE RELATIONSHIP BETWEEN THE PANCREOZYMIN SECRETIN AND GASTRIC SECRETION TESTS. (Jap.) Ito, Y. (2nd Natl. Hosp., Tokyo), H. Shibata and H. Kashima. *Iryo* 24(9):699-703, 1970.

1061 SIGNIFICANCE OF PANCREATIC FUNCTION IN EVALUATING DIGESTIVE FUNCTION. III. EFFECT OF HISTALOG AND GASTRIN IN THE PANCREOZYMIN SECRETIN TEST. (Jap.) Ito, Y. (2nd Natl. Hosp., Tokyo), H. Shibata and H. Kashima. *Iryo* 24(10):797-803, 1970.

1062 SENSITIVE METHOD FOR STUDYING TRYPSIN IN DUODENAL AND PANCREATIC JUICE. (Rus.) Fomina, L. S. (Acad. Med. Sci., Moscow), N. N. Bassarguine and V. P. Kondrachova. *Lab. Delo* (6):350-354, 1970.

1063 THE EFFECT OF TRYPSIN INHIBITORS ON PANCREATOPEPTIDASE E, TRYPSIN, CHYMOTRYPSIN AND AMYLASE IN THE PANCREAS AND INTESTINAL TRACT OF CHICKS RECEIVING RAW AND HEATED SOYA BEAN DIETS. (E.) Gertler, A. (Hebrew U. Sch. Agric., Rehovot, Israel) and Z. Nitsan. *Br. J. Nutr.* 24(4):893-904, 1970.

1064 MOLECULAR ARCHITECTURE OF PEPTIDE HORMONES: OPTICAL ROTATORY DISPERSION OF CHOLECYSTOKININ-PANCREOZYMIN, BRADYKININ AND 6-GLYCINE BRADYKININ. (E.) Bodanszky, A. (Case Western Reserve U. Dept. Chem., Cleveland, Ohio), M. Bodanszky, E. J. Jorpes, V. Mutt and M. A. Ondetti. *Experientia* 26(9):948-950, 1970.

1065 METABOLIC AND HEMODYNAMIC EFFECTS OF SECRETIN AND PANCREOZYMIN ON THE PANCREAS. (E.) Frogge, J. D. (U. Kansas Med. Ctr., Kansas City), A. S. Hermreck and A. P. Thal. *Surgery* 68(3):498-502, 1970.

See also numbers: 907, 1096

1066 EFFECT OF PHENOBARBITAL ON BILIRUBIN METABOLISM IN GUNN RATS. EXPERIMENTS WITH UNLABELED AND ^{14}C-LABELED BILIRUBIN. (Ger.) Lüders, D. (Univ. Pediatr. Clin., Gottingen, Germany). *Z. Kinderheilkd.* 109(2):149-168, 1970.

Serum bilirubin levels decreased significantly in Gunn rats within 5 min after injection with a single dose of phenobarbital (20 mg/100 g i.v.), either alone or in combination with 30 mg of 20% human serum albumin. A single i.p. injection of phenobarbital (10 mg/100 g) had no effect on serum bilirubin levels. Significant decreases in serum bilirubin also occurred after increasing the doses of phenobarbital administered s.c. for 1-2 weeks. In Gunn rats with bile fistulas given an i.v. bilirubin load, the peak bilirubin concentration and excretion rate in bile were increased, and the peak serum bilirubin level was less, in animals pretreated with s.c. phenobarbital for 2-3 weeks. These results and studies with ^{14}C-labeled bilirubin revealed that s.c. injection of phenobarbital for 2 weeks did not reduce serum bilirubin levels by causing a shift of bilirubin from binding to albumin in the intravascular compartment, but increased formation of water-soluble metabolites in the liver and increased biliary and urinary excretion of bilirubin. It is also suggested that the rats had some bilirubin glucuronyl transferase activity, as indicated by a bile bilirubin concentration of 4-6 mg/100 ml, and that phenobarbital treatment stimulated the activity of this enzyme.

1067 TRANSFER OF BILIRUBIN THROUGH THE LIVER OF GUNN RATS. (E.) Okoliczányi, L. (U. Lausanne Ctr. Electron Micr., Switzerland) and P. Magnenat. *Experientia* 26(7):733-734, 1970.

The possibility that unconjugated bilirubin may be excreted in the bile was studied in Gunn rats congenitally incapable of forming conjugated bilirubin. After i.v. infusion of 15-45 mg of unconjugated bilirubin, following a priming dose of 2 mg/kg, plasma and bile bilirubin concentrations increased within 5 min and remained high throughout the 20-min observation period. Bile and plasma bilirubin concentrations were not significantly different except with the 45 mg dose after 15 min, a phenomenon attributed to the toxic action of unconjugated bilirubin, which was also manifested by dyspnea and reduced bile flow. When novobiocin (4 mg/100 g) was given alone with the bilirubin infusion, plasma bilirubin levels were higher and bile bilirubin concentrations significantly lower. This was attributed to known interference of novobiocin with transfer of bilirubin across the hepatocyte, and indicated that the unconjugated bilirubin had passed into the bile by transfer through the liver cell.

1068 PHOTOCATABOLISM OF LABELED BILIRUBIN IN THE CONGENITALLY JAUNDICED (GUNN) RAT. (E.) Ostrow, J. D. (U. Pennsylvania Med. Serv.-VA Hosp., Philadelphia). *J. Clin. Invest.* 50(3):707-718, 1971.

Metabolism of labeled bilirubin was studied in homozygous jaundiced Gunn rats before, during, and after a period of exposure to 1700 foot candles of daylight fluorescent light to elucidate the mechanism by which phototherapy reduces serum bilirubin. Exposure to light caused a marked increase in the biliary excretion of radioactive and diazoreactive compounds, which gradually returned to control values after the lights were switched off. Spectral and chromatographic analysis of the excreted pigments and their azopigments showed that the increased biliary radioactivity during phototherapy consisted of unconjugated bilirubin and water-soluble bilirubin derivatives in approximately equal fractions. In animals in which phototherapy produced little decline in plasma bilirubin, despite comparable acceleration of bilirubin catabolism, the lack of effect was tentatively attributed to increased synthesis of early labeled bilirubin.

1069 DIMERISATION OF BILIRUBIN DIGLUCURONIDE AND FORMATION OF A COMPLEX OF BILIRUBIN AND THE DIGLUCURONIDE. (E.) Jacobsen, J. (U. Aarhus Inst. Biochem., Denmark). *Scand. J. Clin. Lab. Invest.* 26(4):395-398, 1970.

In vitro studies showed that bilirubin diglucuronide forms a dimer with a dissociation constant of 7 x 10^{-5} M which is of the same order of magnitude as the dissociation constant for bilirubin dimer (1 x 10^{-4} M) at the same ionic strength and temperature. At pH 8.2, bilirubin and bilirubin diglucuronide form a complex with a dissociation constant of 2 x 10^{-6} M in a solution in which the ratio of bilirubin to the diglucuronide was 1:1. Reversal of this complex formation by 90% ethanol, 6 M urea, or 0.1% Tween 80 suggests that hydrophobic bonds are involved in this complex formation. The complex of bilirubin and bilirubin diglucuronide is stable enough to be present in blood plasma of infants with icterus neonatorum.

1070 BILE ACIDS. XXXII. ALLOCHOLIC ACID, A METABOLITE OF ALLOCHENODEOXYCHOLIC ACID IN BILE FISTULA RATS. (E.) Mui, M. M. (St. Louis U. Sch. Med., Mo.) and W. H. Elliott. *J. Biol. Chem.* 246(2):302-304, 1971.

The metabolism of 3β-^{3}H-allochenodeoxycholic acid was studied in rats with bile fistulas to ascertain the relationship between this compound and allocholic acid. Collected bile contained 53-59% of the ^{3}H label by 21 hr after 3β-allochenodeoxycholic acid was administered. Ninety-five per cent of the ^{3}H appeared in the unchanged acid while 0.3% and 4.5% appeared in two trihydroxy acids. Approximately 85% of the latter compound was identified as allocholic acid.

The former fraction appeared to contain allohyocholic acid. A distinct difference in the metabolism of 5α- and 5β-cholanic acids seems evident, and it appears that the 12α-hydroxylation of a cholanic acid nucleus in the rat was also demonstrated.

1071 QUANTITATIVE STUDIES ON THE EXCRETION OF GLUCURONIDE AND MONO- AND DISULPHATE CONJUGATES OF NEUTRAL STEROIDS IN HUMAN BILE. (E.) Laatikainen, T. (U. Helsinki Dept. Med. Chem., Finland). *Ann. Clin. Res.* 2(4):338-349, 1970.

Bile samples were taken from 14 human subjects and analyzed for $C_{19}O_2$, $C19O_3$ and $C_{21}O_2$ steroid conjugates using Sephadex LH-20 chromatography, fractionation on silicic acid, and gas-liquid chromatography. Fistula bile samples from men and women contained average total steroid concentrations of 1300 μg/100ml and 650 μg/100ml, resp., while gallbladder bile samples from women had 2200 μg/100ml. Most of the C_{19} steroids were in the form of $C_{19}O_2$ steroid diols and $C_{19}O_3$ steroids. The main compounds of the $C_{21}O_2$ steroids quantitated were 5β-pregnane-3α, 20α-diol as glucuronide and 5-pregnene-3β,20α-diol as the disulfate. The $C_{19}O_2$, $C_{19}O_3$, and $C_{21}O_2$ steroids with a 3β-hydroxy-Δ^5 and 3α-hydroxy-5α structure were excreted mainly as mono- and/or disulfates while those with a 3α-hydroxy-5β structure were predominantly in the glucuronide fraction.

1072 ALTERATIONS IN THE LIPIDS OF HUMAN HEPATIC BILE AFTER THE ORAL ADMINISTRATION OF BILE SALTS. (E.) Bell, C. C., Jr. (VA Hosp., Richmond, Va.), Z. R. Vlahcevic and L. Swell. *Surg. Gynecol. Obstet.* 132(1):36-42, 1971.

Iron bile salt administration (1.8-2.2 g/day p.o. for 4 days) significantly increased daily bile flow and biliary phospholipid and cholesterol excretion in 5 patients with conventional T-tube drainage of the common bile duct. Withdrawal of bile salts for the next 3 days led to a prompt fall in biliary phospholipid and no significant change in bile output or in biliary cholesterol excretion. After a second p.o. course of bile salts, phospholipid, but not cholesterol, excretion again significantly increased. Bile salt administration produced a relatively greater increase in biliary bile salts and phosoholipid than in cholesterol, and this alteration in lipid composition enhanced the solubilization of biliary cholesterol. These results suggest that judicious p.o. administration of bile salts may prove beneficial in providing sufficient bile salts in the enterohepatic circuit to maintain biliary cholesterol in solution.

1073 THE FORMATION OF IRON COMPLEXES WITH BILE AND BILE CONSTITUENTS. (E.) Jacobs, A. (Welsh Natl. Sch. Med., Cardiff) and P. M. Miles. *Gut* 11(9):732-734, 1970.

Soluble iron-bile complexes formed when human bile was mixed with a ferric chloride solution at pH 7 or when it was mixed at pH 2 and then neutralized with sodium hydroxide. Gel filtration on Sephadex G-25 and G-200 indicates that, in contrast to the ascorbic acid-iron complex, the iron-bile complex has a high molecular weight. Pretreatment of the bile with hydrogen peroxide or heating of the bile to destroy its ascorbic acid had no effect on the iron-binding capacity of the bile or on the gel-filtration characteristi of the iron-bile complex. These findings provide no evidence that ascorbic acid is responsible for the iron-binding capacity of bile. Cholic acid and sodium glycocholate were both effective in maintaining iron in solution at pH 6-8; deoxycholic acid and sodium taurocholate were less effective; and bilirubin was effective only at pH 8, probably because of its poor solubility in more acid media. Formation of high molecular weight iron complexes by cholic acid and sodium glycocholate strongly suggests that complex formation predisposes to polymerization of these substances.

1074 THE ROLE OF MICROSOMAL DRUG-METABOLIZING ENZYMES IN THE BILIARY EXCRETION OF 3,4-BENZPYRENE IN THE RAT. (E.) Levine, W. G. (Albert Einstein Coll. Med., Bronx, N. Y.). *J. Pharmacol. Exp. Ther.* 175(2):301-310, 1970.

Study of the action of microsomal drug-metabolizin enzymes in the biliary excretion of 3,4-benzpyrene in female Wistar rats showed that pretreatment with 3-methylcholanthrene or benzpyrene greatly enhanced the rate of metabolism and biliary excretion of benzpyrene. Emetine inhibited both metabolism and rate of biliary excretion by 50%. When benzpyrene metabolites were injected into male rats (which metabolize benzpyrene at a rate 2.5 times that of females), their biliary excretion greatly exceeded the rate observed when benzpyrene was injected, however this rate could not be increased by the inducers. Ethionine partially blocked induction of biliary excretion by methylcholanthrene. Conversion to metabolites seems to be the rate-limiting step in the biliary excretion of benzpyrene, and the observed acceleration of excretion after administration of inducing agents may be attributable to enhancement of this metabolic phase.

1075 EFFECTS OF PHENOBARBITAL ON THE PLASMA DISAPPEARANCE AND BILIARY EXCRETION OF DRUGS IN RATS. (E.) Klaassen, C. D. (U. Kansas Med. Ctr., Kansas City). *J. Pharmacol. Exp. Ther.* 175(2):289-300, 1970.

Sprague-Dawley rats received 4 daily i.p. injections of 75 mg/kg phenobarbital and the resultant plasma disappearance and biliary excretion of i.v.-injected drugs were studied 24 hr after the last injection. There was a significant increase in both plasma disappearance and biliary excretio of phenol-3,6-dibromphthalein disulfonate (an analogue of BSP), amaranth, and ouabain, none of which are conjugated before excretion. The plasma disappearance of indocyanine green was increased, while its excretion was not affected. Increases in disappearance and excretion were also seen with BSP, bilirubin, succinylsulfathiazole, chlorothiazide and procaine amide ethyl bromide, but not with phenol red, taurocholate or probenecid. In most cases, the increased rate of plasma disappearance was due to increased bile flow and excretion.

1076 DOSE-RESPONSE RELATIONSHIP OF BILE FLOW TO CHOLECYSTOKININ STIMULATION AS MEASURED BY DUODENAL DRAINAGE. (E.) Priest, R. J. (Henry Ford Hosp., Detroit, Mich.), R. F. Gluckmann, J. E. Berk and J. A. Rinaldo. *Henry Ford Hosp. Med. J.* 18(4):257-262, 1970.

Normal persons exhibited no significantly different response in 20-min volumes and bilirubin concentrations of their duodenal aspirates after i.v. cholecystokinin in doses of 7.5-25 Ivy dog units, although the smaller doses tended to give lower values. In patients with functioning gallbladders containing stones, or nonfunctioning gallbladders, and in cholecystectomized patients, lowering the cholecystokinin dosage resulted in no significant change in the volume flow of bile. Lowering the dose of cholecystokinin from 18.5 to 7.5 units, but not from 25.0 to 18.5 units, lowered the bilirubin output, suggesting that the large dose of cholecystokinin stimulated emptying of the diseased, as well as the normal, gallbladders. The median output of bilirubin was about 3000 units less than normal at any dosage of cholecystokinin tested in the post-cholecystectomized patients. The dosage of cholecystokinin which differentiates the bile flow response to it in the several diagnostic categories was greater than 12.5, but less than 25, Ivy dog units.

1077 MAXIMAL BILIARY TRANSPORT OF SULFOBROMOPHTHALEIN IN THE WISTAR RAT. A CRITICAL STUDY. (E.) Dhumeaux, D. (H. Mondor Hosp., Creteil, France), P. Berthelot, A.-M. Preaux, S. Erlinger and R. Fauvert. *Minn. Med.* 54(2):107-114, 1971.

Maximal BSP transport was studied in Wistar CF rats during constant infusion of BSP at rates exceeding its maximal excretion rate into the bile (250-350 µg/100 g body weight/min). Under these conditions, both BSP biliary excretion rates and bile flow rates decreased continuously by 28% and 38%, resp., of the early peak levels after 140 min of infusion. The rate of BSP excretion varied directly with that of bile flow. Concomitant administration of bile salts (dehydrocholic acid at 200 µg/min/100 g body weight) simultaneously increased the choleresis and maximal transport of BSP. The concentration of BSP in bile did not change in the presence or absence of bile salts.

1078 THE CELLULAR TRANSPORT OF MAGNESIUM IN RAT LIVER. (E.) Wallach, S. (State U. New York Downstate Med. Ctr., Brooklyn), P. J. Gamponia and S. A. Ahmed. *J. Gen. Physiol.* 56(6):716-731, 1970.

Influx and efflux transfer coefficients of ^{28}Mg for in vitro preparations of Sprague-Dawley rat liver cells were 0.074 and 0.019 per min, resp. With increased extracellular Mg^{++}, there was a 30% decrease in influx and a 31% increase in efflux; the opposite result was obtained with decreased extracellular Mg^{++}. With reduction of temperature from 37C to 0C both coefficients were decreased by 65%. Transport was decreased by Ca^{++} and increased by NaCN and increased pH. No significant changes were observed with Sr^{++}, iodoacetate, lactate, ethanol, omission of glucose from the incubation mixture, decreased pH, or alterations in the Na^+:K^+ ratio. The quantitative and qualitative aspects of flux of Mg^{++} in this system were similar to those of Ca^{++}, suggesting that these two ions share a common transport mechanism, probably dependent on binding to macromolecular ligands within the cell membrane or within the cell.

1079 THEORETICAL EXPLANATION OF NUTRIENT AND OXYGEN SUPPLY TO THE LIVER CELLS AS A FUNCTION OF THEIR POSITION IN THE LIVER LOBULE. (Ger.) Worchol, J. B. (Med. Acad. Histol. Inst., Poznan, Poland). *Acta Histochem. (Jena)* 38(1):92-104, 1970.

A mathematical model was set up for Rappaport's acinar unit to explain changes which occur in the blood concentrations of nutrients and oxygen as the blood flows through the acinus. This model demonstrates that the highest concentrations of these substances are present in the portal part of the sinusoids, but it does not necessarily follow that liver cells in zone 1 of the acinus are better supplied than those in zone 3. The validity of this model is supported by: (1) some histochemical evidence that cells in zone 3 are very active and (2) the higher oxygen uptake in zone 3 than in zone 1 is due to the greater rate of aerobic glycolysis in the former. This model would account for the finding that hepatotoxic agents cause more damage in zone 3 of the acinar unit than in zone 1.

1080 RAPID PASSAGE OF MANNITOL INTO LIVER AND BILE. (E.) Lanman, R. C. (U. Missouri Dept. Pharmacol., Kansas City) and L. S. Schanker. *Life Sci.* [1] 9(17):1003-1010, 1970.

Adult male Charles River rats were injected with either 1-^{14}C- or 1,6-^{14}C-D-mannitol (6.8 mg/kg i.v.), and the time course of equilibration of mannitol between plasma water and liver water determined. From 1-120 min after injection, bile and liver samples were obtained for assay of radioactivity. Plasma samples (from carotid arterial blood) were examined by scintillation techniques. Water content of liver, plasma, and bile was about 72.0%, 94%, and 97%, resp. Plotting of mannitol concentrations as a function of time showed that maximal bile concentration was reached within 1 min. Steady-state distribution between bile and plasma, and between liver and plasma, also occurred within 1 min; this was too rapid to determine which took place first. Thus, a predominantly intercellular route of entry of mannitol into the bile could not be established. Mannitol equilibrated with 89% of the total liver water. Distribution of intracellular water between parenchymal and nonparenchymal liver cells indicates that mannitol has ready access to parenchymal cell water, while nonparenchymal cells are relatively impermeable to mannitol.

1081 FURTHER STUDIES OF THE TRANSPORT OF AMINO ACIDS IN RAT LIVER SLICES. (E.) Crawhall, J. C. (McGill U. Clin., Montreal, Quebec, Canada) and M. G. Davis. *Biochim. Biophys. Acta* 225(2):326-334, 1971.

The transport of α-aminoisobutyric acid was inhibited by glycine (competitively), dinitrophenol, Na$^+$ free medium, iodoacetate, and anaerobiosis. The transport of labeled glycine by liver slices was rapid. Cysteine was transported faster and for a longer period than cystine and gave concentration gradients greater than that observed for cystine. Kinetic studies showed that cystine was transported by a single saturable system that was inhibited by glycine but not by α-aminoisobutyric acid. Two transport systems were involved in cysteine transport, one system being inhibited strongly by glycine and weakly by α-aminoisobutyric acid, the other inhibited only by glycine. Lysine and valine both exist at a higher concentration intracellularly than in the plasma *in vivo*, but no intracellular gradients were obtained after *in vitro* incubations. Perhaps intracellular gradients for these amino acids are maintained by hepatic protein catabolism.

1082 QUANTITATIVE CHARACTERIZATION OF DENSE BODY, AUTOPHAGIC VACUOLE, AND ACID PHOSPHATASE-BEARING PARTICLE POPULATIONS DURING THE EARLY PHASES OF GLUCAGON-INDUCED AUTOPHAGY IN RAT LIVER. (E.) Deter, R. L. (Baylor Coll. Med., Houston, Tex.). *J. Cell Biol.* 48(3): 473-489, 1971.

Within 10-20 min after i.p. injection of glucagon, the number of autophagic vacuoles and the osmotic sensitivity of acid phosphatase-bearing particles increased, while the number of dense bodies decreased; these changes reached a maximum 50 min after treatment. While no consistent change in total acid phosphatase activity was noted, the average volume of autophagic vacuoles was 440-870% greater than that of normal dense bodies during this time period. The presence of 5 different types of autophagic vacuole profiles were revealed, two of which (Types I and II) accounted for 76.3-94.4% of the profiles examined. Type I profiles contained elements of the endoplasmic reticulum, free ribosomes and unstructured cytoplasm. Type II profiles had mitochondrial profiles as their principal constituent, but endoplasmic reticulum and free ribosomes were also seen. Type I profiles predominated (55-69%) at all times. Both profile types were bounded by single and double limiting membranes, the former predominating. Morphometric parameters derived from profile size distributions indicated that the number of Type I and II autophagic vacuoles increased with time; the rate was greater for the Type II particle, except between 40 and 50 min. Apparently, pre-existing dense bodies could be the principal source of the digestive enzymes known to exist in the autophagic vacuoles, provided they contained most of the lysosomal hydrolases found in normal liver tissue.

1083 A HISTOCHEMICALLY DEMONSTRABLE THIAMINE-PYROPHOSPHATASE ACTIVITY IN THE SINUSOIDAL ENDOTHELIUM OF THE LIVER. (E.) Sandström, B. (Inst. Human Anat., Uppsala, Sweden) *Histochemie* 24(4):281-296, 1970.

Liver sections from the cat, rat, chicken, and frog were fixed in 2.5% glutaraldehyde, embedded in polyethylene glycol, sectioned, and then incubated for 1-3 hr in an enzyme reaction mixture using thiamine pyrophosphate chloride as the major substrate. A new histochemically demonstrable thiamine pyrophosphatase was observed having a high degree of substrate specificity, and localized solely in the cytosomes of the sinusoidal endothelium. A high concentration of lead ion was required to demonstrate its activity. This enzyme, which resists formaldehyde fixation, ethanol and many inhibitors, has an optimum pH of 6.

1084 STUDIES ON THE SYNTHESIS AND TRANSPORT OF ALBUMIN IN MICROSOMAL SUBFRACTIONS FROM RAT LIVER. (E.) Glaumann, H. (Karolinska Inst. Sabbatsberg Hosp., Stockholm, Sweden). *Biochim. Biophys. Acta* 224(1):206-218, 1970.

Liver microsomes from adult male albino rats were subfractionated by washing with 0.15 M Tris buffer at pH 8.0 and disrupted by ultrasonication to obtain 3 microsomal protein fractions: adsorbed, membranous, and luminal proteins. Albumin, separated from other proteins by extraction with trichloroacetic acid and ethanol, constituted almost half of the luminal proteins. Most of the albumin (45%) was recovered from the rough subfraction, 35% from the smooth I subfraction, and 10% from the smooth II subfraction; on a membrane protein basis, relatively more albumin was found in the smooth fractions, especially in the smooth II microsomes, than in their rough counterparts. Results of experiments with ^{14}C-leucine indicate that albumin synthesis occurred almost exclusively on ribosomes attached to membranes rather than on free ribosomes. Albumin is then transferred to the lumen of the rough endoplasmic reticulum and it is later transported into the smooth endoplasmic reticulum. Both smooth I and smooth II microsomes participate in this process, suggesting that these microsome fractions originate from the intracellular membranes of parenchymal liver cells, probably from the endoplasmic reticulum or closely related membranes. Studies of albumin migration after inhibition of protein synthesis with cycloheximide (0.05 mg/100 g i.v. into the portal vein) demonstrated that intracellular transport of albumin was independent of protein synthesis. Injection of rats with phenobarbital (8 mg/100 g i.p.) increased the rate of ^{14}C-labeled leucine incorporation into membranous proteins and increased the number of microsomal membranes, but had little or no effect on the microsomal albumin content or on albumin synthesis.

1085 EFFECTS OF CORTISONE ON OROTIC ACID TRANSPORT AND RNA SYNTHESIS IN RAT LIVER.

(E.) Yu, F.-L. (Columbia U. Inst. Cancer Res., New York, N. Y.) and P. Feigelson. *Arch. Biochem. Biophys.* 141(2):662-667, 1970.

A study was made of the effect of a single dose of cortisone acetate (5 mg/kg i.p.) on labeled orotate transport, the conversion of orotate to uridine nucleotide, the precursor pool sizes, and the rate of RNA synthesis in livers of adrenalectomized male Sprague-Dawley rats. A 20 min in vivo pulse-labeling period with ^{3}H-orotic acid was employed. Cortisone enhanced acid-soluble radioactivity for at least 8 hr, and caused a parallel increase in total and uridine nucleotide radioactivity without detectably changing the size of the precursor pool. This suggests that cortisone does not specifically increase the rate at which ^{3}H-orotic acid is converted into acid-soluble uridine nucleotides. Cortisone increased the rate of RNA synthesis by increasing the rate of uridine nucleotide synthesis, and by stimulating uridine nucleotide incorporation into the uracil of RNA. By combined pulse-labeling in vivo with ^{3}H-orotic acid, 5,6-^{3}H-uridine, and 8-^{14}C-guanine, it was demonstrated that hormonally induced increases in the radioactivity of the acid-soluble pool were due only to enhanced transport of orotate into the liver cells; the other RNA precursors were not affected by cortisone injection. Under the conditions used in these experiments, orotic acid had a much slower turnover rate than the other 2 RNA precursors so that it should be most effective for long-term incorporation studies. Labeled orotic acid is also more efficiently incorporated into RNA than guanine and uridine.

1086 THE EFFECT OF PREGNANCY ON LIPID COMPOSITION OF GUINEA PIG GALLBLADDER BILE.

(E.) Holzbach, R. T. (St. Luke's Hosp., Cleveland, Ohio), M. E. Marsh and M. C. Hallberg. *Gastroenterology* 60(2):288-293, 1971.

Total bile acids were measured by an enzymatic method, lecithin by the Bartlett phospholipid method, and cholesterol by gas chromatography in a study of guinea pig gallbladders. There was a significant increase in bile acid concentration in the term pregnancy group when compared to age-matched virgin female controls. In the postpartum state there was a significant decrease in bile acid concentration and a significant increase in lecithin concentration compared to results observed in the same animals at term. In all groups studied, there was no change in cholesterol concentration. Although the possible lithogenic significance of the above changes cannot presently be assessed due to species differences, this is the first systematic study of the effect of pregnancy on bile lipid composition.

1087 SYSTEMIC TOXICITY OF POLYINOSINIC ACID: POLYCYTIDYLIC ACID IN RODENTS AND DOGS.

(E.) Phillips, B. M. (Miles Labs. Inc., Elkhart, Ind.), R. E. Hartnagel, P. J. Kraus, R. P. Tamayo, E. H. Fonseca and R. L. Kowalski. *Toxicol. Appl. Pharmacol.* 18(1):220-230, 1971.

The LD_{50} of a single dose of the double-stranded polymer of polyinosinic acid:polycytidylic acid in the mouse was 75 and 150 mg/kg after i.v. and i.p. administration, resp., while in the rat it was 185 and 365 mg/kg, resp. Mongrel dogs died after doses as low as 2.5 mg/kg after first exhibiting decreased motor activity, lack of coordination, vomiting, and flaccid prostration. No toxicity was seen after a 42 day period of 2.0 mg/kg administered i.p. to rats or 0.2 mg/kg i.v. to beagle dogs, although severe toxicity (lethal in 3 of 6 animals) was seen with a 21 day course of 2.0 mg/kg i.v. in dogs. Toxicity was evidenced clinically by decreased motor activity, lack of coordination, vomiting, anorexia, and weight loss; in the laboratory it was seen in terms of decreased hematopoiesis, increased serum levels of alkaline phosphatase and transaminases; and pathologically, thymic degeneration, bone marrow destruction, dilatation of the centrilobular hepatic sinusoidal capillaries, hepatocyte necrosis, collapse of hepatic structure and generalized arteritis were observed.

1088 EFFECT OF INSECTICIDES ON RAT LIVER REGENERATION.

(E.) Gershbein, L. L. (Northwest Inst. Med. Res., Chicago, Ill.). *Res. Commun. Chem. Pathol. Pharmacol.* 1(6): 740-748, 1970.

Partially hepatectomized and intact male and female Holtzman and Charles River rats were fed diets containing DDT, its metabolite DDE, methoxychlor, aldrin, dieldrin, and heptachlor for 10 days. DDT (150 ppm) and, to a lesser extent, DDE (200 ppm) stimulated liver regeneration in hepatectomized males, but the other insecticides had no effect. None of the insecticides, including DDT (225 ppm), significantly affected liver regeneration in hepatectomized females. Liver enlargement developed in intact males given DDT (150 ppm), but no appreciable effect was noted in intact females. Sex differences may be due to differences in the rate at which these insecticides are metabolized and the extent to which they are deposited in fat depots.

1089 EFFECT OF METHYLCHLOROFORM INHALATION ON BARBITURATE HYPNOSIS AND HEPATIC DRUG METABOLISM IN MALE MICE.

(E.) Lal, H. (U. Rhode Island Dept. Pharmacol. Toxicol., Kingston) and H. C. Shah. *Toxicol. Appl. Pharmacol.* 17(3): 625-633, 1970.

Exposure to 1,1,1-trichloroethane (3000 ppm, 24 hr inhalation) reduced hexobarbital sleeping time (hypnosis) but had no effect on hypnosis produced by barbital or chloral hydrate, indicating that CNS sensitivity to the depressants was not reduced in male mice. The reduction was maximal at 24 hr and not present 48 hr after the termination of exposure. The effect of trichloroethane inhalation on hexobarbital hypnosis was dependent on the flow rate of air passing through the trichloroethane reservoir. When 24 hr exposure was completed in 3 to 6 exposure periods (each separated by 18-21 hr), trichloroethane inhalation showed a cumulative effect; a single 8-hr exposure, however, was ineffective. Increased metabolism of hexobarbital by liver microsomal enzymes was apparently responsible for the reduction in hexobarbital hypnosis since there was an increased ability of liver supernatant fraction to oxidize hexobarbital after trichloroethane inhalation. Its ability to reduce p-nitrobenzoic acid remaining unchanged. The protein content of this liver supernatant fraction also was not altered after exposure to trichloroethane.

1090 ULTRASTRUCTURE OF STH CELLS OF THE PARS DISTALIS OF HEPATECTOMIZED MICE.

(E.) Echave Llanos, J. M. (La Plata Natl. U. Inst. Embryol. Biol. Histol., Argentina), C. L. Gomez Dumm and A. C. Nessi. *Z. Zellforsch. Mikrosk. Anat.* 113(1):29-38, 1971.

The effect of hepatectomy on the ultrastructure of somatotropic hormone-secreting cells of the pars distalis was studied in male mice, with intact and sham-operated mice serving as controls, to determine if a circadian rhythm exists in these hypophyseal cells. The most striking changes were observed in animals sacrificed at midnight on the 2nd day after hepatectomy. These changes included: 1) hypertrophy of the Golgi complex with an increased number of immature granules within the Golgi zone; 2) strong dilatation of the endoplasmic reticulum whose cisternae contained much electron dense material; 3) granules with partially diminished electron density; 4) release sites, characterized by dense zones in the plasmalemma, close to aggregates of electron lucent microvesicles, and almost empty granule membranes; 5) increased mitochondrial density; 6) increased number of autophagic lysosomes; and 7) irregular nuclear outlines. Hepatectomy seems to stimulate increased synthesis and release of growth hormone in the cells, and the subsequent role of the pars distalis in liver regeneration is suggested.

1091 CYTOARCHITECTURE OF RAT LIVER DURING COMPENSATORY GROWTH.

(E.) Iatropoulos, M. J. (Brown U. Div. Biol. Med. Sci., Providence, R. I.). *Anat. Rec.* 169(3):509-514, 1971.

The effect of subtotal hepatectomy or porcelain bead implantation on hepatic lobular radius (or portal-central vein distance) was studied. In subtotally hepatectomized rats, the distances were increased by the 28th day, and they return to control values by the 84th day postoperatively. Following bead implantation, distances were 352 µ on day 28 and 305 µ on day 42. The formation of new lobules occurred sometime between days 56 and 112 after hepatectomy. Formation of new lobules after implantation occurred earlier (after the 4th week) than subtotal hepatectomy because the implanted bead provided a greater stimulus.

1092 LIVER REGENERATION IN RATS AFTER PARTIAL HEPATECTOMY AND DURING ACUTE CCl_4 INTOXICATION.

(Ger.) Stöcker, E. (Univ. Pathol. Inst., Wurzburg, Germany) and W. Boecker. *Experientia* 26(7):763-765, 1970.

Liver cell proliferation was studied autoradiographically with ^{3}H-thymidine in adult male Sprague-Dawley rats in which 2/3 of the liver had been removed, and reparative regeneration was stimulated 3 hr later by a single injection of CCl_4 (0.03 ml/100 g i.p.). In these animals, the cell-labeling and mitotic indices of liver epithelial cells increased 8 hr later, and compensatory regeneration reached a maximum 16 hr later, than in animals subjected to partial hepatectomy alone. Reparative regeneration due to CCl_4-induced necrosis began 48 hr after surgery.

1093 EFFECT OF EXOGENOUS HEPATIC RNA ON THE COURSE OF EXPERIMENTAL CIRRHOSIS.

(Rus.) Chernukh, A. M. (Inst. Normal Pathol. Physiol., Moscow), E. D. Vyshepan, I. L. Razumova, N. N. Alekseeva and N. S. Chinenova. *Biull. Eksp. Biol. Med.* 70(10):12-15, 1970.

Male mice were given 0.04 ml of CCl_4 s.c. twice a week for 1-2 months. When these mice were also given injections of freshly prepared cytoplasmic RNA (60-80 µg i.p.) from rat liver, the death rate was reduced. Histological examination of livers from RNA-treated animals showed only occasional foci of necrosis, although more "ghost" cells were present in the peripheral lobes and there was twice as much interlobular connective tissue as in controls. No differences were found in the content and distribution of fat or in total lipid content. RNA administration also significantly increased mitotic activity in the liver. The increased survival of RNA-treated mice may be due to increased mitosis, but it is also possible that increased replacement of necrotic cells with connective tissue reduces the toxic effect of CCl_4 at a stage when death results from intoxication.

1094 SYNTHESIS OF DEOXYRIBONUCLEIC ACID BY ISOLATED LIVER NUCLEI. (E.) Lynch, W. E. (U. Pittsburgh Sch. Med., Pa.), R. F. Brown and T. Umeda. *J. Biol. Chem.* 245(15):3911-3916, 1970.

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1142 BILE SECRETION OF THE LIVER IN ALBINO RATS WITH EXPERIMENTAL HYPERTHYROIDISM AND HYPOTHYROIDISM. (Rus.) Gaidukov, V. A. (Ternopol Med. Inst., USSR). *Biull. Eksp. Biol. Med.* 70(11):48-50, 1970.

1143 THE EFFECT OF PHENOBARBITAL ON SERUM BILIRUBIN OF FULL-TERM INFANTS. A CONTROLLED STUDY. (E.) Kokosky, M. J. (U. Southern California Los Angeles County Med. Ctr.), H. A. Falconer and L. Weiss. *Henry Ford Hosp. Med. J.* 18(4):275-282, 1970.

1144 UPTAKE OF PROBENECID BY RAT LIVER SLICES. (E.) Gigon, P. L. (Natl. Cancer Inst., Bethesda, Md.) and A. M. Guarino. *Biochem. Pharmacol.* 19(9):2653-2662, 1970.

1145 MECHANISM OF PHENOBARBITAL-INDUCED HYPERCHOLERESIS IN THE RAT. (E.) Berthelot, P. (Beaujon Hosp., Clichy, France), S. Erlinger, D. Dhumeaux and A. M. Preaux. *Am. J. Physiol.* 219(3):809-813, 1970.

1146 EFFECT OF THYROID HORMONE ON THE SUBSTRATE INTERACTION WITH [CYTOCHROME]

P450 IN THE OXIDATION OF DRUGS BY LIVER MICROSOMES. (E.) Kato, R. (Natl. Inst. Hyg. Sci., Tokyo), A. Takanaka and A. Takahashi. *J. Biochem. (Tokyo)* 68(5):613-623, 1970.

1147 EFFECT OF CYCLOSERINE, ETHIONAMIDE, AND ETHOXIDE ON LIVER FUNCTION IN PATIENTS WITH PULMONARY TUBERCULOSIS. (Rus.) Baildinova, I. M. *Ter. Arkh.* 43(1):101-104, 1971.

1148 BILIARY SECRETION OF ROSE BENGAL IN THE DOG. (E.) Varga, F. (Univ. Med. Sch., Pecs, Hungary) and E. Fischer. *Acta Physiol. Acad. Sci. Hung.* 38(2-3):143-149, 1970.

1149 HUMORAL FACTOR TRIGGERING DNA SYNTHESIS AFTER PARTIAL HEPATECTOMY IN THE RAT. (E.) Sakai, A. N. (U. Rochester Div. Urol., N. Y.). *Nature (Lond.)* 228(5277):1186-1187, 1970.

1150 DNA SYNTHESIS IN POLYPLOID AND BINUCLEATE HEPATIC CELLS IN THE REGENERATING RAT LIVER OF DIFFERENT AGES. (E.) Watanabe, M. (U. Nagoya Sch. Med., Japan). *Nagoya J. Med. Sci.* 33(1):1-11, 1970.

1151 EFFECTS OF BERYLLIUM ON DEOXYBIRONUCLEI ACID SYNTHESIZING ENZYMES IN REGENERATI RAT LIVER. (E.) Witschi, H. P. (U. Montreal Sch. Med., Canada). *Biochem. J.* 120(3):623-634, 1970.

1152 PHOSPHOLIPID METABOLISM DURING REGENERATION OF RAT LIVER. (E.) Fex, G. (U. Umea Dept. Chem., Sweden). *Biochem. J.* 119(4): 743-747, 1970.

1153 HEPATIC LIPID CHANGES DURING LIVER REGENERATION IN THE RAT. (E.) Gershbe L. L. (Northwestern Inst. Med. Res., Chicago, Ill.) and E. J. Singh. *Acta Hepatosplenol. (Stuttg.)* 17(5):307-323, 1970.

1154 FORMATION OF HEPATIC LOBULES IN REGENERATING LIVER TISSUE. (Rus.) Yashina, I. N. (Inst. Med. Genet., Moscow). *Biull. Eksp. Biol. Med.* 70(10):95-98, 1970.

See also numbers: 1026, 1050

INTESTINE

1155 PHOSPHOFRUCTOKINASE IN RAT JEJUNAL MUCOSA. SUBCELLULAR DISTRIBUTION, ISOLATION, AND CHARACTERIZATION. (E.) Ho, W. (VA Hosp., San Francisco, Calif.) and J. W. Anderson. *Biochim. Biophys. Acta* 227(2):354-363, 1971.

In studies of rat jejunal mucosa, 88% of the total phosphofructokinase activity was recovered in the 105,000 x g supernatant. A 10-fold purification of the enzyme was achieved by differential centrifugation, ammonium sulfate precipitation, and Sephadex gel filtration. The active enzyme may exist as a protein with a molecular weight of 190,000. The jejunal phosphofructokinase preparation demonstrated similar kinetic properties with respect to ATP, Mg^{+2}, and fructose-6-phosphate to those demonstrated for phosphofructokinase from other tissue sources. Jejunal phosphofructokinase activity was decreased or increased by the removal or addition of SO_4^{-2}, resp., suggesting that SO_4^{-2} might have a stabilizing effect on the enzyme. Enzyme activity was inhibited by Na$^+$, but not by K$^+$. The comparatively high level of jejunal phosphofructokinase observed suggests that phosphofructokinase may not be as critical as hexokinase in the control of glycolysis in intestinal mucosa.

1156 INTESTINAL ENTEROKINASE. MECHANISMS OF ITS "SECRETION" INTO THE LUMEN OF THE SMALL INTESTINE. (E.) Hadorn, B. (U. Bern Clin. Res. Unit, Switzerland), N. Steiner, C. Sumida and T. J. Peters. *Lancet* 1(7691):165-166, 1971.

Isolated brush borders from rat and guinea pig small intestinal mucosa were treated with a bile-acid mixture and the two forms of enterokinase were studied using ultracentrifugation to test the theory that bile acids act as a "releasing factor" for enterokinase. Following treatment with increasing doses of bile acids, there was first a linear increase of the total enterokinase activity until maximum activity was reached. Following centrifugation of the brush border suspension, enterokinase activity of the supernatant fluid increased 10-fold after the addition of bile salts.

157 STUDIES ON THE ULTRASTRUCTURAL LOCALIZATION OF INTESTINAL DISACCHARIDASES. (E.) Benson, R. L. (NIH Baltimore City osps., Md.), B. Sacktor and J. W. Greenawalt. . *Cell Biol.* 48(3):711-716, 1971.

correlated kinetic study of the removal by apain of sucrase, isomaltase, maltase and rehalase activities and of the 60 Å particles rom the brush border was performed to test the ypothesis that hamster intestinal disaccharidases nd the 60 Å knobs seen in the electron microscope y negative staining are identical. All enzymes xcept trehalase were solubilized; however each f the disaccharidases showed a distinct pattern f release with time, indicating differences in he binding of the enzymes to the brush border embrane. Upon the removal of 90-100% of the ucrase, isomaltase, and maltase activities uring incubation, many of the knobs remained ttached, making it impossible to correlate isaccharidase release with particle removal.

158 THE TURNOVER OF DISACCHARIDASES AND BRUSH BORDER PROTEINS IN RAT INTESTINE. E.) James, W. P. T. (Harvard Med. Sch., Boston, ass.), D. H. Alpers, J. E. Gerber and K. J. sselbacher. *Biochim. Biophys. Acta* 230(2): 94-203, 1971.

ollowing the i.v. injection of leucine or mixed mino acids, the incorporation and turnover of mino acids was measured in different protein ractions of the small intestinal mucosa of rats. he observed delay in the incorporation into rush border fraction was consistent with the ime required for the transfer of newly formed roteins from within epithelial cells. The half-life of the brush border (18 hr) was shorter han that of the homogenate (31 hr) or other ubcellular fractions after maximal labeling. urified disaccharidases exhibited a faster urnover rate (11.5 hr) than whole brush borders. o differences in turnover between the disaccharides ould account for the reduction in lactose ctivity observed in adult (as compared to eonatal) rats. Control of disaccharidase turnover may be at the villus level and not depend n cell formation in the intestinal crypts.

159 MICRO-DIVER STUDIES ON ISOLATED INTESTINAL CELLS. (E.) Hamberger, L. U. Goteborg Dept. Physiol., Sweden) and O. undgren. *Experientia* 27(1):56-57, 1971.

xygen consumption per unit area of a cell cluster measured by a "micro-diver" technique) was pproximately twice as great for isolated jejunum ells at the base of villi than for cells at the ip. The addition of 3-0-methylglucose (5 mM) to he incubation medium (Tris HCl buffer) increased he rate of oxygen consumption. This effect ossibly reflects an augmented metabolic activity nduced by the active transport of the sugar across the cell wall. With the "micro-diver" technique, it seems possible to isolate and study the respiration of intestinal cells from different levels of the villus before and after addition of different solutes.

1160 EFFECT OF ORCHIDECTOMY ON THE INTESTINAL SECRETION OF DOGS. (E.) Misra, N. K. and S. Kumar (Jawaharlal Nehru Med. Coll., Aligarh, India). *Endocrinology* 87(6): 1361-1363, 1970.

Thiry-Vella loops were made in mongrel dogs from 15-cm segments of jejunum and, after several days of measuring basal levels of intestinal secretion, dogs were subjected to bilateral orchiectomy. The rate of secretion of intestinal contents decreased from a mean of 2.6 ml/hr before orchiectomy to a mean minimum level of 1.0 ml/hr after orchiectomy, having stabilized at this level by about the 8th day. After a single i.m. injection of testosterone, the rate of secretion began to rise almost immediately, reached a maximum mean level of 4.5 ml/hr by about the 6th to 8th day after injection, and dropped back to the preinjection level by days 9-12. This observed increase was considered significant. After orchiectomy, intestinal bicarbonate concentration decreased by days 5-8 from a mean of 87.4 mEq/liter to a minimal mean level of 61.8 mEq/liter. After testosterone, the bicarbonate concentration showed a significant and rapid, but irregular, increase, reached a maximum mean level of 91.9 mEq/liter by days 6-8, and dropped to preinjection levels by days 11-13. Intestinal amylase activity first fell and then rose to significant maximum levels (169.6 Somogyi U/ml) by days 9-10; after testosterone administration, this level fell significantly to a minimum mean level of 95.8 Somogyi U/100 ml on days 7-8.

1161 EFFECTS OF PROSTAGLANDINS, THEOPHYLLINE, AND CHOLERA EXOTOXIN UPON TRANSMUCOSAL WATER AND ELECTROLYTE MOVEMENT IN THE CANINE JEJUNUM. (E.) Pierce, N. F. (Baltimore City Hosps., Md.), C. C. J. Carpenter, Jr., H. L. Elliott and W. B. Greenough, III. *Gastroenterology* 60(1):22-32, 1971.

Net secretion of electrolytes and water from the jejunum was observed in dogs with 65-cm jejunal Thiry loops and cannulas inserted into the superior mesenteric artery by way of the thoracic aorta. Observations were made after i.a. infusion of prostaglandins E_1, A_1 and $F_2\alpha$ and of theophylline; lesser effects were observed after instillation of the prostaglandins directly into the jejunum at the same rates. The net rate of secretion with mucosal application of cholera exotoxin was greater than that observed with prostaglandin infusion. Synergism was noted with simultaneous infusion of prostaglandin $F_2\alpha$ and theophylline at slow rates. In individual dogs, there was a correlation between the maximal response to infusion of prostaglandin and to intrajejunal cholera exotoxin.

1162 GLUCAGON STIMULATES BRUNNER'S GLAND SECRETION. (E.) Himal, H. S. (Mt. Sinai Sch. Med., New York, N. Y.), F. Moqtaderi and D. A. Dreiling. *Nature (Lond.)* 228(5273):767-768, 1970.

1163 BIOSYNTHESIS OF TRIGLYCERIDES FROM TRIOSE PHOSPHATES BY MICROSOMES OF INTESTINAL MUCOSA. (E.) Rao, G. A. (Texas A & M U. Dept. Biochem., College Station), M. F. Sorrels and R. Reiser. *Lipids* 5(9):762-764, 1970.

1164 EFFECTS OF CATIONS ON D-GLUCOSE DISSOCIATION FROM TRIS-DISRUPTED BRUSH BORDERS PREPARED FROM HAMSTER JEJUNUM. (E.) Faust, R. G. (U. North Carolina Sch. Med., Chapel Hill), M. G. Leadbetter and E. F. Therrien. *Life Sci.* 9, Pt. 1(21):1227-1231, 1970.

1165 THE METABOLISM OF THE SMALL INTESTINE: GLYCOLYSIS IN THE MUCOSA OF THE SMALL INTESTINE OF THE SHEEP. (E.) Wahle, K. W. J. (U. Newcastle upon Tyne Dept. Agric. Biochem., England), D. G. Armstrong and H. S. A. Sherratt. *Comp. Biochem. Physiol.* 38(16):5-20, 1971.

1166 COMPARISON OF INTESTINAL METABOLISM IN THE CONVENTIONAL AND SPECIFIC PATHOGEN-FREE (SPF) RATS. (E.) Hietanen, E. (U. Turku Dept. Physiol., Finland), A. Aitio and O. Hanninen. *Scand. J. Clin. Lab. Invest.* 25(Suppl. 113):58, 1970.

1167 HUMAN NORMAL AND ABNORMAL GASTROINTESTINAL FLORA. (E.) Haenel, H. (German Acad. Sci. Inst. Nutr., Berlin). *Am. J. Clin. Nutr.* 23(11):1433-1439, 1970.

1168 NORMAL FECAL FLORA OF MAN. (E.) Gall, L. S. (Becton Dickinson Res. Ctr., Raleigh, N. C.). *Am. J. Clin. Nutr.* 23(11): 1457-1465, 1970.

See also numbers: 905, 928, 949, 955, 1063, 1671, 1773

1169 CORONARY AND VISCERAL VASOACTIVITY ASSOCIATED WITH EATING AND DIGESTION IN THE CONSCIOUS DOG. (E.) Vatner, S. F. (U. California San Diego Dept. Med., La Jolla), D. Franklin and R. L. Van Citters. *Am. J. Physiol.* 219(5):1380-1385, 1970.

After full recovery from instrumentation with ultrasonic or electromagnetic flow probes on the ascending aorta, left circumflex coronary, mesenteric, renal and iliac arteries, and with miniature pressure gauges in the aorta, the effects of eating and digestion were investigated in conscious dogs. Transient increases in cardiac output, arterial blood pressure, and heart rate occurred with the presentation and ingestion of food. Mesenteric blood flow initially decreased for a short time, returned to control levels while the dog continued to eat, and gradually reached a maximum (15-200% above control) 30-90 min postprandially. Iliac flow decreased by 10% 30-60 min postprandially as long as the dog did not walk about. Renal resistance increased during the anticipation ingestion phase, and was followed by a gradual return to normal over the next 10-30 min. Left circumflex coronary flow uniformly increased during the anticipation ingestion phase, and returned to control levels within 15-30 min. The most marked increase in coronary flow and decreases in calculated resistance occurred within 30 sec of eating. Apparently there is little reflex vasoconstriction or redistribution of blood flow from the coronary to the mesenteric circulation. The increase in coronary flow could be associated with the increased metabolic demands of the heart resulting from increased arterial pressure, cardiac output, heart rate, and left ventricular work.

1170 THE ADRENERGIC INNERVATION OF THE VESSELS SUPPLYING AND DRAINING THE GASTROINTESTINAL TRACT. (E.) Furness, J. B. (U. Melbourne Dept. Zool., Victoria, Australia). *Z. Zellforsch. Mikrosk. Anat.* 113(1):67-82, 1971.

Stretch preparations and sections of blood vessels taken from cats, guinea pigs, rabbits, amd rats were examined. The major mesenteric arteries supplying blood to the digestive tract (celiac, superior and inferior mesenteric) were all supplied by adrenergic fibers, the innervation becoming more dense closer to the gut. Most nerve fibers were at the border between the media and adventitia with a few fibers, however, penetrating the mediae of some larger arteries. In stretch preparations, the adrenergic plexus consisted of 2 components: medium to large paravascular nerve trunks running along the vessel and small nerve fibers, without prominent varicosities, which formed a meshwork in the vessel surface. Capillaries were almost exclusively without adrenergic innervation, and specialized adrenergic innervation of arteriovenous anastomoses was not found. The veins within the gut wall were sparsely innervated; veins of less than 100μ generally were not innervated at all. The hepatic portal vein was heavily innervated, most of the nerves being at the outer limit of the circular muscle. Dense innervation of the whole length of arteries suggests a sympathetic or vasoconstrictive control over both total and local blood flow. Constriction of certain veins (hepatic and superior mesenteric) suggests that the gut vessels may act as a blood reservoir.

1171 LONG TERM LIVER BLOOD FLOW MEASUREMENTS IN RATS UNDER PHYSIOLOGICAL CONDITIONS. (E.) Ohnhaus, E. E. (Roy. Postgrad. Med. Sch., London), E. Emons and A. Breckenridge. *Pfluegers Arch.* 323(2):182-186, 1971.

An improved method using the principle of internal calorimetry as an automatic recorder was described for long-term studies measuring liver blood flow in 28 rats. The resting daily levels of liver blood flow were relatively constant in individual rats, with low standard deviations. Epinephrine (5 μg i.v.) produced an expected increase in liver blood flow. In 3 animals, connective tissue was demonstrated around the flow probe. Sterilization of the thermocouple before operation and non-lacquering of the tip of the thermoneedle may lessen the appearance of connective tissue in the liver round the probe. Advantages of using this method of measuring liver blood flow by internal calorimetry are that an indifferent electrode (cold junction) need not be implanted in the liver, and that the lower equilibrium temperature can be used for the determination of changes in tissue temperature due to noncirculatory factors such as metabolic heat production.

1172 HEMODYNAMIC STUDY OF THE HEPATIC CIRCULATION AFTER OCCLUSION OF THE SUPERIOR MESENTERIC ARTERY AND THE HEPATIC ARTERY. (Fr.) Andreadis, P. (Univ. Surg. Clin., Salonika, Greece), G. Blatzas, D. Toussis and K. Kiriakou. *Angiology* 22(1):37-45, 1971.

In dogs, complete or incomplete (80%) occlusion of the hepatic artery increased blood flow in the portal vein and superior mesenteric artery. Increased blood flow into the portal vein can be accounted for by increased outflow from the superior mesenteric artery with a simultaneous decrease in visceral resistance (shunts); this ensures that the liver cells are supplied with oxygen. Complete or incomplete (80%) occlusion of the superior mesenteric artery produced hemodynamic and pathological disorders similar to those seen in hypovolemic shock. A postsinusoidal block can develop, and cellular lesions in the centrilobular area can progress to necrosis. The rapid onset of postsinusoidal block indicates that a sphincter mechanism in the region of the central vein is involved. Pathological changes found in this region are caused by inadequate oxygen supply to the liver cells; this is due to a decrease in portal flow and to sinusoidal congestion produced by RBC accumulation. In these experimental studies, the increase in portal blood flow which occurred 10-30 min after occlusion of the superior mesenteric artery could not be explained. It may be that this is caused by sudden emptying of visceral blood into the portal vein following progressive microcirculatory disorders in the viscera or even by spasm in the veins of the portal system.

1173 CONTROL OF PORTAL BLOOD FLOW--HUMORAL MECHANISMS. (E.) Hutchin, P. (U. California Dept. Surg., San Diego), R. M. Peters, N. A. Coulter, M. D. Feezor and G. Johnson, Jr. *Ann. Surg.* 173(1):78-84, 1971.

Dynamic changes in the portal circulation in response to epinephrine or histamine were assessed by measuring the disappearance rate of ^{133}Xenon. In response to epinephrine infusion, the hepatic artery and portal blood flow rates increased to 116% and 135%, resp., of their control values. The increase in portal vein flow was statistically significant. Histamine decreased hepatic artery and portal vein blood flow. The portal pressure also fell uniformly in all dogs. In response to epinephrine, the splenic blood flow and portal pressure both increased significantly. Histamine infusion provoked a fall in splenic blood flow; however, systemic arterial and portal pressures were unchanged. The fall in resistance and increased flow were probably the result of the opening of arteriovenous connections in response to epinephrine. Histamine may oppose the above activity by stimulating closure of arteriovenous communications.

1174 EFFECT OF ADRENERGIC DRUGS ON THE HEMODYNAMICS OF THE ISOLATED PERFUSED RAT LIVER. (E.) Noguchi, Y. (Pfizer Taito Co. Nagoya Pharmacol. Lab., Japan) and G. L. Plaa. *Arch. Int. Pharmacodyn. Ther.* 187(2):336-348, 1970.

Epinephrine and norepinephrine regularly produced a decrease in the portal inflow and hepatic weight, and an increase in the portal pressure, in studies of isolated perfused rat liver. The reaction was rapid at the onset, returned to a level close to normal, but took nearly 1 hr for complete recovery (termed the slow response). The recirculation of norepinephrine or epinephrine and their vasoactive metabolites were apparently the main cause of the slow response. Angiotensin and some precursors and metabolites of epinephrine produced similar responses as with epinephrine, except that the slow response was not observed and different doses were required. Phenoxybenzamine blocked epinephrine and norepinephrine responses; the latter also was temporarily abolished by atropine. Because of the absence of responses following isoproterenol and the absence of a blocking effect following dichloroisoproterenol, the receptors for adrenergic drugs apparently are of the α-type. The presence of β-receptors was not detected in rat liver. Administration of phenoxybenzamine from the hepatic artery caused only a partial block of norepinephrine effects when the latter was administered by way of the portal vein, suggesting the existence of sinusoids served jointly by hepatic arterial and portal venous branches, as well as intact sinusoidal receptors in areas served only by the portal vein.

1175 MUCOSAL BLOOD FLOW IN CANINE ANTRAL AND FUNDIC POUCHES. (E.) Rudick, J. (Mt. Sinai Hosp., New York, N. Y.), J. L. Werther, M. L. Chapman, D. A. Dreiling and H. D. Janowitz. *Gastroenterology* 60(2):263-271, 1971.

Extrapolated values for mucosal blood flow of the resting fundus in graphic studies of aminopyrine clearance as related to acid output during secretory stimulation correlated well with mucosa blood flow during acid instillations. Aminopyrin clearance from the antrum and fundus of the stomach increased with increasing doses of histam the antrum:fundus perfusion ratio, however, dropped from 0.53:1 to 0.27:1. Isoproterenol (1 mg/kg/min) increased antral blood flow by 110% and resting fundic mucosal blood flow by 100%. Vasopressin decreased antral and resting fundic mucosal blood flow by 75% and 72%, resp. In control experiments without aminopyrine, the net loss of H^+ ions from each pouch remained constant over 5 hr. On the basis of unit surface area, the antrum was 15 times more permeable than the fundus. The aminopyrine clearance method is apparently a valid measurement of gastric mucosal blood flow.

1176 THE FATE OF INTRAVENOUSLY ADMINISTERED RADIOLABELED GASTRIN. (E.) Newton, W. T. (Washington U. Sch. Med., St. Louis, Mo.) and B. M. Jaffe. *Surgery* 69(1):34-40, 1971.

The disappearance of i.v. administered ^{125}I-labeled gastrin in dogs was studied in order to evaluate the distribution and site of inactivati of gastrin. Following a single i.v. injection of the radiolabeled gastrin, it disappeared rapidly from peripheral plasma (half-life of 10. min) due to metabolic degradation, probably in the renal cortex. Urinary clearance of ^{125}I gastrin was very low (4.0 ml/min). There were no real differences between the distribution of ^{125}I-gastrin and Na^{125}I within the liver, pancrea or small intestine.

1177 PRODUCTION AND CHARACTERIZATION OF SPECIFIC ANTIBODIES TO GASTRIN WITH NO

ROSS-REACTIVITY WITH CHOLECYSTOKININ-PANCREOZYMIN. E.) McGuigan, J. E. (U. Florida Coll. Med., ainesville). *Am. J. Med. Sci.* 260(3):139-149, 970.

wo groups of rabbits were immunized with human astrin I, residues 1-17, and human gastrin I, esidues 1-13, resp., each covalently conjugated o bovine serum albumin molecules using triazine. n additional group received both immunogens equentially. It was possible to substantially nhance the immunologic specificity of antibodies o gastrin by immunization with the amino- ridecapeptide of human gastrin I following arlier immunization with intact human gastrin I. ollowing repeated and exclusive immunization ith the conjugate containing the amino-tridecaeptide of gastrin, antibodies were produced and haracterized which exhibited no immunological ross-reactivity with cholecystokinin-pancreozymin. s seen by previous techniques, antibodies to astrin exhibited immunological cross-reactivity ith cholecystokinin-pancreozymin (probably ecause of their identical carboxyl-terminal etrapeptide amides); these antibodies with xclusive specificity for the gastrin molecule ay be of value in specific identification and easurement of gastrin, particularly in tissues nd physiologic fluids containing substantial mounts of cholecystokinin-pancreozymin.

178 NATURE OF IMMUNOREACTIVE GASTRIN EXTRACTED FROM TISSUES OF GASTRO- NTESTINAL TRACT. (E.) Berson, S. A. and R. S. alow (VA Hosp., Bronx, N. Y.). *Gastroenterology* 0(2):215-222, 1971.

astrin extracted from the mucosa of human astrointestinal tissues obtained at surgery or t autopsy was subjected to the fractionation rocedures used for plasma gastrin. Two immunoeactive components with the same characteristics s the 2 plasma gastrin components were separable n the basis of size and charge. Heptadecapeptide astrin had a more acidic charge and smaller olecular size than the major plasma component; owever, the minor plasma component resembled eptadecapeptide gastrin in both respects. Most xtracts of antral mucosa were high in the eptadecapeptide-like form, but the relative bundance of the larger component increased istally, and it was the only detectable component n the proximal jejunal mucosa. The 2 components ere immunochemically indistinguishable from the plasma components and from porcine heptadecapepide gastrin.

179 OBSTRUCTION OF INFERIOR VENA CAVA AS A FACTOR FOR REDUCED BLOOD PRESSURE ON ISTENSION OF STOMACH IN DOGS. (E.) Jakhanwal, . P. (M.G.M. Med. Coll., Jamshedpur, India), . P. Bhardwaj, A. K. Datta and P. Mohanty. *ndian J. Physiol. Pharmacol.* 14(1):19-24, 1970.

1180 INTRAMITOCHONDRIAL CRYSTALLOIDS AND AMORPHOUS GRANULES. OCCURRENCE IN EXPERIMENTAL HEPATIC ISCHEMIA IN DOGS. (E.) Shiraki, K. (Child. Hosp., Los Angeles, Calif.) and H. B. Neustein. *Arch. Pathol.* 91(1):32-40, 1971.

1181 EFFECTS OF SOME VASODILATOR DRUGS ON THE HEPATIC CIRCULATION. (E.) Geumei, A. (U. Alexandria Sch. Med., UAR), M. Mahfouz and I. Issa. *Alexandria Med. J.* 16(3):276-279, 1970.

1182 LOCAL CHANGES IN VASCULAR RESISTANCE AS A RESULT OF CHEMICAL REFLEXES OF VARIOUS PARTS OF THE INTESTINE. (Rus.) Samoilenko, A. V. *Fiziol. Zh. SSSR* 56(9): 1227-1232, 1970.

1183 TECHNIQUE FOR STUDYING BLOOD VESSELS OF THE VERMIFORM APPENDIX. (Rus.) Bessonov, I. A. *Arkh. Anat. Gistol. Embriol.* 59(8):99-101, 1970.

1184 APPENDIX AND GM ANTIBODY FORMATION. III. UPTAKE AND DISTRIBUTION OF SOLUBLE OR ALUM-PRECIPITATED BOVINE γ-GLOBULIN INJECTED INTO THE RABBIT APPENDIX. (E.) Hanaoka, M. (U. Kyoto Inst. Virus Res., Japan), R. M. Williams and B. H. Waksman. *Lab. Invest.* 24(1):31-37, 1971.

1185 MICROBIAL COLONIZATION OF THE GASTRO- INTESTINAL TRACT. (Rev.) (Ger.) Bernhardt, H. (Ernst Moritz Arndt U. Med. Clin., Greifswald, Germany) and M. Knoke. *Z. Gesamte Inn. Med.* 25(19):896-899, 1970.

1186 LESSONS FROM THE SEA FOR GASTROENTEROLOGY. (E.) Wolf, S. (U. Texas Med. Branch, Galveston). *Gastroenterology* 59(6):823-826, 1971.

1187 FASTING IN ETHIOPIA. AN ANTHROPOLOGICAL AND NUTRITIONAL STUDY. (Rev.) (E.) Knutsson, K. E. (U. Stockholm Dept. Anthropol., Sweden) and R. Selinus. *Am. J. Clin. Nutr.* 23(7):956-969, 1970.

1188 CLINICAL EXPERIMENTAL STUDIES ON BILIARY, PANCREATIC, AND STOMACH SECRETION AFTER ADMINISTRATION OF PLANT CHOLAGOGUES IN A SUSPENSION OF Carduus marianus, Chelidonium and Curcuma. (Ger.) Baumann, J. C. (Auguste Victoria City Hosp., Berlin/Schoneberg), K. Heintze and H. W. Muth. *Arzneim. Forsch.* 21(1):98-101, 1971.

1189 POLYPEPTIDE HORMONES OF THE GASTROINTESTINAL TRACT. (Ger.) Sewing, K. F. Z. (U. Tubingen Pharmacol. Inst., Germany). *Z. Gesamte Inn. Med.* 26(4):17-20, 1971.

1190 LEUCINE AMINOPEPTIDASE VARIATIONS IN HUMAN FOETAL ORGANS. (E.) Pataryas, H. A. (U. Athens Dept. Gen. Biol., Greece) and C. Christodoulou. *Hum. Hered.* 20(3):325-328, 1970.

1191 LIPID METABOLISM AND PHYSICAL EXERTION. (Ger.) Keul, J. (Univ. Dept. Circulat. Res., Freiburg i. Br., Germany) and G. Haralambie *Med. Welt.* 21(39):1689-1692, 1970.

1192 EFFECTS OF DIETARY CARBOHYDRATES ON BODY LIPID COMPOSITION AND ON SOME ENZYMATIC ACTIVITIES IN THE RAT. (E.) Angelico, R. (Superior Inst. Hyg., Rome), L. Moretta, G. Improta and P. L. Ialongo. *Nutr. Metabol.* 12(3): 179-191, 1970.

1193 ELECTROMYOGRAPHY OF THE ESOPHAGUS AND ITS CLINICAL APPLICATIONS. (E.)
Tokita, T. (Gifu Med. Sch., Japan), K. Tashiro and K. Kato. *Acta Otolaryngol. (Stockh.)* 70(4): 269-278, 1970.

Simultaneous electromyograms of the esophagus were made in humans under a number of conditions with an intraluminal lead apparatus. In the resting state, 100-volt spike-bursts were recorded for the upper esophagus, but not for the mid- and lower esophagus, which tended to show electrocardiograph-type artifacts; these spike-bursts were considered to be localized reflex action potentials secondary to the presence of the electrode tube. When the subjects swallowed 5 ml of water, a spike-burst successively appeared in the larynx, upper, mid-, and lower esophagus. In the lower esophagus, the propagated spike-burst was followed by a repetition of spike-bursts which seemed to indicate localized peristalsis. On dry swallowing, a spike-burst appeared in the lower esophagus about 5 sec after that in the laryngeal muscle, but this did not always appear; there was no repetitive spike-burst in the lower esophagus. When 5 ml of water was instilled into the esophagus for 5 sec through a vinyl tube, a spike-burst was usually found in the lower esophagus; spike-bursts of different intensities were observed when 10% syrup, 3% sodium bicarbonate, 0.01% HCl, or 2% bitter tincture were instilled as above. When 10 ml of air was forced into the esophagus for 0.5 sec, a spike-burst appeared in the lower esophagus within 5 sec. When patients were injected with 1% pilocarpine, all observed spike-bursts were intensified; a lesser effect was seen with 0.1% atropine, while the effects of injection with mecholyl and tolazoline were equivocal. Observations in a patient from whom the pharynx and cervical esophagus had been removed suggest that esophageal peristalsis after swallowing is propagated by the extrinsic nerves, and not by muscular fibers of the esophageal wall. Results were also reported for 4 patients with esophageal dysfunction.

1194 THE VALUE OF SIMPLE TESTS FOR PERISTALTIC ACTIVITY IN HIATUS HERNIA. (E.)
Powis, S. J. A. (Queen Elizabeth Hosp., Birmingham, England) and J. L. Collis. *Thorax* 25(4):457-458, 1970.

Esophageal peristaltic activity was measured in 194 patients to determine the usefulness of barium swallows in assessing the type and degree of esophageal lesions associated with hiatus hernia. The variation in both the first wave and the time of clearance, in both controls and patients with esophageal disorders, made these factors clinically useless in assessing lesions.

1195 GASTRIC SECRETION STIMULATED BY GASTRIN-LIKE AOC-TETRAPEPTIDE. (E.)
Yamagata, S. (Tohoku U. Sch. Med., Sendai, Japan), H. Masuda, A. Ishimori, S. Inoue, T. Wada, K. Sato, H. Kinoshita, T. Nose, M. Masuda, K. Kawai, T. Uematsu, H. Sato, K. Yunoki and S. Sasahira. *Tohoku J. Exp. Med.* 101(2):103-117, 1970.

A study was made of the clinical utility of a new synthetic gastrin-like tetrapeptide (t-amyloxycarbonyl-tryptophan-methionine-aspartic acid-phenylalanine; AOC-tetrapeptide), in the diagnosis of gastric diseases. Computer analysis (11 parameters) revealed that 4 mg/kg body weight of the tetrapeptide yielded the maximal acid secretory response, characterized by an earlier appearance of a higher maximal response value than with betazole (1 mg/kg). The tetrapeptide was effective in differentiating endoscopically normal gastric mucosa and duodenal ulcer as to certain parameters: volume, free and total acidity, and free and total acid output. The differential diagnosis was, however, unsatisfactory in cases of some endoscopically distinguishable conditions of the stomach such as atrophic gastritis and gastric ulcer. The reduction of technical errors and enhancement of diagnostic accuracy of mucosal atrophic changes by gastric biopsy may improve the reliability of gastric analysis, and increase the clinical value of AOC-tetrapeptide in differential diagnosis of gastric diseases.

1196 INCREASED RATIO OF GLYCINE/TAURINE CONJUGATED BILE ACIDS IN THE EARLY DIAGNOSIS OF TERMINAL ILEOPATHY. PRELIMINARY REPORT. (E.) Bruusgaard, A. (Aalborg Municipal Hosp., Denmark) and E. H. Thaysen. *Acta Med. Scand.* 188(6):547-548, 1970.

The ratio of glycine/taurine conjugated bile acids (G/T ratio) in 2 patients with terminal ileopathy (Crohn's disease) was studied. The G/T ratio in the duodenum of the 2 patients with diarrhea and moderate steatorrhea was increased before conventional methods showed evidence of terminal ileopathy. The diagnosis of terminal ileitis was later confirmed by surgical and microscopic findings.

1197 BROWN SERUM IN TROPICAL SPRUE. (E.)
Weiner, S. V., L. H. Bernstein (Lincoln Hosp., Bronx, N. Y.) and S. Gutstein. *Am. J. Dig. Dis.* 16(2):178-180, 1971.

Intestinal absorption studies were used to confirm diagnosis of tropical sprue in 4 patients with brown serum specimens. Crystalline folic acid caused the brown color to disappear within 24-48 hr after p.o. administration. Chemical determination revealed a mean level of 60-80 mg/100 ml methemalbumin in all 4 serum specimens. Serum bilirubin and glucose-6-phosphate dehydrogenase levels were normal.

1198 SUBSTRATE DIFFERENTIATION OF HUMAN PANCREATIC AND SALIVARY ALPHA-AMYLASES. (E.) Hall, F. F. (Scott and White Mem. Hosp., Temple, Tex.), C. R. Ratliff, T. Hayakawa, T. W. Culp and N. C. Hightower. *Am. J. Dig. Dis.* 15(11):1031-1038, 1970.

By determining the activities of serum amylases to 2 different substrates, Lintner Soluble Starch (LSS) and an insoluble dyed starch, Amylose Azure (AA), it is possible to differentiate between elevated serum amylase activities due to pancreatitis and those due to parotitis. The LSS/AA enzyme activity ratios in serum from 6 patients with pancreatitis averaged only half those measured in serum from 5 patients with parotitis. Measurements of amylase activity in 11 paired salivas and duodenal fluids revealed that the mean LSS/AA enzyme activity in saliva was about twice that in duodenal fluid, and the mean values for these 2 ratios were significantly different. Even larger differences were found between the ratios for crystalline salivary amylase and amylase in purified human duodenal fluid and pancreatic homogenates.

1199 A RADIOMETRIC ASSAY OF COPPER BINDING IN BIOLOGICAL FLUIDS AND ITS APPLICATION TO ALIMENTARY SECRETIONS IN NORMAL SUBJECTS AND WILSON'S DISEASE. (E.) Gollan, J. L. (U. Adelaide Roy. Hosp., Australia), P. S. Davis and D. J. Deller. *Clin. Chim. Acta* 31(1):197-204, 1971.

Copper binding by synthetic chelating agents, saliva, gastric juice, duodenal aspirate, and bile from normal persons was determined by a newly developed radiometric assay which depends on the ability of most copper-chelate compounds to resist hydrolysis and remain soluble at pH 8. The linearity, sensitivity and specificity of the method was determined for edetic acid and L-histidine. In each of the alimentary secretions studied, there were copper binding components which formed soluble complexes under the alkaline conditions imposed in vitro. Fluids from patients with Wilson's disease exhibited no change in copper binding activity (bile samples were unavailable for assay). The endogenous ligands in gastrointestinal secretions may be involved in the mucosal uptake of dietary copper.

1200 MEASUREMENT OF THE ACTIVITY OF BILIRUBIN UDP-GLUCURONYL TRANSFERASE: APPLICATION TO NEEDLE BIOPSY SPECIMENS. (E.) Odièvre, M. (Parrot Hosp., Kremlin-Bicetre, France) and R. Luzeau. *Rev. Eur. Etud. Clin. Biol.* 16(1):84-85, 1971.

As shown previously, initial dialysis of an enzyme suspension against edetic acid increases enzyme activity. The increased sensitivity enables glucuronyl transferase, using bilirubin as substrate, to be measured reproducibly in liver fragments weighing 10-20 mg, the size obtainable by needle biopsy. Using 20 mg of liver, a 1:25 homogenate can be made to provide sufficient material for study of liver function.

1201 MEASUREMENT OF LIVER-IRON CONCENTRATION IN NEEDLE-BIOPSY SPECIMENS. (E.) Barry, M. (Roy. Free Hosp., London) and S. Sherlock. *Lancet* 1(7690):100-103, 1971.

A histochemical method using 4,7-diphenyl-1,10-phenanthroline sulfonate determined total liver iron concentration in needle biopsy specimens from patients with various iron-loading disorders and with chronic liver disease. There was a high degree of correlation between liver iron concentration and penthanil chelatable iron. Coefficients of variation for iron concentration in duplicate specimens from the same liver were 8.6% and 7.1%, in controls and patients with liver disease, resp. As this method measures total iron concentration, and therefore includes the hemoglobin iron content of the specimen, results may be imprecise at iron depletion levels.

1202 ELECTROPRECIPITIN TEST FOR HEPATITIS-ASSOCIATED ANTIGEN AND ANTIBODY. (E.) Rightsel, W. A. (Baptist Mem. Hosp., Memphis, Tenn.), H. A. Moore and E. E. Muirhead. *Am. J. Clin. Pathol.* 55(3):249-254, 1971.

The electroprecipitin test is based on dual electrophoresis in which soluble antigen overtakes and migrates through an antiserum which moves slowly under electric current. This test detected Australia (hepatitis-associated) antigen with an 8-fold greater dilution of the positive serum than the agar gel double diffusion technique. The electroprecipitin test also detected anti-hepatitis-associated antigen at higher dilutions. The electroprecipitin test provides a rapid and sensitive means of detecting hepatitis-associated antigen and antibody in serum. Once the system has been standardized with a potent reference antiserum, the electroprecipitin test detects antigen in hepatitis sera more often than other methods presently available.

1203 THE APPEARANCE OF INTRAHEPATIC BILIARY DUCT DILATATION ON THE LIVER SCAN. (E.) Heck, L. L. (U. Chicago Dept. Radiol., Ill.) and A. Gottschalk. *Radiology* 99(1):135-140, 1971.

External scanning of the biliary ducts was performed in 35 patients with jaundice due to suspected biliary dilatation. Scanning began about 15 min after injection of 6-8 mC of ^{99m}Tc-sulfur colloid. As confirmed by pathological study, interpretation of biliary duct dilatation by scan was correct in 78% of 32 patients available for follow-up. There were no false positives among 25 normal controls. Four criteria of biliary duct enlargement are listed for such a scan study: accentuation or a mass in the junction of the liver lobes; "ducts" or defects not extending to the periphery, especially in the right lobe; a linear defect particularly prominent on the left lobe, with an oblique orientation at the junction of the right and left lobes; and a stellate area of decreased isotope concentration in the mid-right lobe or at the junction of the right and left lobes. In the 20 patients, dilatation of the ducts was due to either carcinoma of the head of the pancreas, common duct stones, or carcinoma of the ampulla of Vater. Based on an experimental model, it was determined that suspension of respiration improved results with this scanning technique.

1204 A NEW IMMUNOCHEMICAL TECHNIQUE FOR A RAPID, SEMI-QUANTITATIVE DETERMINATION OF THE ABNORMAL LIPOPROTEIN (LP-X) CHARACTERIZING CHOLESTASIS. (E.) Seidel, D. (Univ. Med. Clin., Heidelberg, Germany). *Clin. Chim. Acta* 31(1): 225-229, 1971.

An immunochemical technique of protein determination is presented which is based on the theory that an abnormal lipoprotein (LP-X) moves toward the cathode as the very low-density fraction containing lipoprotein composed partially of lipoprotein C (LP-C) moves toward the anode. Because of an immunochemical similarity between LP-X and LP-C, electrophoresis in agar gel is important for the detection and identification of LP-X in whole serum. In most instances of a positive LP-X sample, the characteristic precipitin reaction with rabbit antiserum was detected 30 min to 1 hr after incubation. In cases of an extremely low LP-X concentration, incubation for 2 hr may be indicated. Regarding necessary incubation time, this method is superior to the conventional immunoelectrophoresis technique using an antiserum trough because the diffusion distance between antiserum and antigen is diminished to almost zero. Lipoprotein concentrations as low as 20 mg/100 ml were detected by this method. To follow the LP-X serum concentration may prove useful as a means to determine cholestasis or obstructive jaundice, and the subsequent course of therapy.

1205 AN ASSESSMENT OF SERUM ^{57}Co CYANOCOBALAMIN AS AN INDEX OF VITAMIN B_{12} ABSORPTION. (E.) Donaldson, D. (Redhill Gen. Hosp., Surrey, England), B. J. N. Blight and P. T. Lascelles. *J. Clin. Pathol.* 23(7):558-562, 1970.

After a 12-hr fast, patients received a p.o. dose of approximately 0.5 µC of ^{57}Co-vitamin B_{12}, as well as a standard flushing dose of 1000 µg of nonlabeled vitamin B_{12} i.m. About 3 days later, patients received about 10 mg of hog intrinsic factor concentrate. Urine was collected over the following 24 hr, and serum was studied 8 hr about the labeled dose. Subjects included in this study were controls with a wide range of neurological diseases and some patients with peripheral neuropathies not due to vitamin B_{12} deficiency. The mean 24-hr urinary excretion (given as per cent of dose) was 18.1%, while the mean 8-hr serum level (given as counts/sec/8 ml specimen) was 0.78. When studies were repeated in the same patients, the mean maximum difference in urine values was 2.5%, with serum values of 0.16 counts/sec/8 ml.

1206 VITAMIN B_{12} ABSORPTION IN SOME NEUROLOGICAL AND NEUROENDOCRINE DISORDERS. (E.) Donaldson, D. (Redhill Gen. Hosp., Surrey, England) and P. T. Lascelles. *J. Clin. Pathol.* 23(7):563-568, 1970.

Levels of serum and urine ^{57}Co-vitamin B_{12} in the Schilling test were measured to assess absorption of the vitamin in patients with neurological diseases, and to compare them with values reported previously in normal persons. In patients with pernicious anemia, and in those who had undergone partial gastrectomy and had neurological disorders, levels were measured both before and after administration of intrinsic factor. In those with pernicious anemia, levels before intrinsic factor were significantly lower than normal, rising to normal levels after administration of intrinsic factor. In patients with hypopituitarism, levels were higher than in normal controls, and the difference was significant for urine levels. No significant differences from normal were found in epileptic patients treated with anticonvulsant drugs that induced folic acid deficiency. In partially gastrectomized patients, there were no significant differences from normal in either serum or urine values before or after administration of intrinsic factor.

1207 SIMPLE FECAL TESTS OF ABSORPTION. A PROSPECTIVE STUDY AND CRITIQUE. (E.) Moore, J. G. (VA Hosp., Salt Lake City, Utah), E. Englert, Jr., A. H. Bigler and R. W. Clark. *Am. J. Dig. Dis.* 16(2):97-105, 1971.

The value of 4 fecal screening tests in diagnosing malabsorption was assessed in 39 patients (15 abnormal, 24 controls) on a regulated diet. The Sudan stain for fat, with or without prior heat and acidification, was in agreement with fecal fat concentration coefficients in 69% of the comparisons. Microscopic examination of stools for meat fibers yielded an overall accuracy of 76%. Radiotriolein tests proved to be no better than the stool meat fiber tests (79% accuracy). Gelatin film tests were negative in most of the patients regardless of the presence or cause of malabsorption. With all the tests, the accuracy in cases of mild steatorrhea was lowest, making them least helpful when such diagnosis would be most valuable. Stool meat fiber analysis was as good as, or better than, the other methods of testing when meat intake was high. Patients with pancreatic insufficiency could not be distinguished from those with other causes of malabsorption using the gelatin film test, stool meat fiber study, or the Sudan staining method.

1208 CLINICAL TEST MEALS AND METHODS FOR STUDYING STOMACH SECRETION. (Rus.) Umanskii, S. S. *Ter. Arkh.* 42(12):9-14, 1970.

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1211 MIMICRY AND DECEPTION IN THE DIAGNOSIS OF TUMORS OF THE GASTRIC CARDIA. (E.) Kaye, J. J. (Cornell Hosp. Med. Ctr., New York, N. Y.) and G. Stassa. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):295-303, 1970.

1212 PASSING THE CANTOR TUBE IN A PATIENT WITH A GASTROENTEROSTOMY: AN UNUSUAL COMPLICATION. (E.) Shulman, H. (Cornell Hosp. Med. Ctr., New York, N. Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):332-333, 1970.

1213 DIAGNOSTIC VALUE OF STOMACH ELECTROGASTROGRAPHY. (Fr.) Kutter, D. (Lab. Clin. Analysis, Luxembourg). *Bull. Soc. Sci. Med. Grand Duche Luxemb.* 107(2):159-168, 1970.

1214 DIAGNOSTIC ERRORS AND THE FUNDUS OF THE STOMACH. REPORT OF AN UNUSUAL CASE. (Fr.) Landry, M. (Canton Hosp., Lausanne, Switzerland) and G. Candardjis. *Ann. Radiol. (Paris)* 13(11-12):863-867, 1970.

1215 ANGIOGRAPHIC FINDINGS IN DISEASES OF THE STOMACH. (E.) Shibata, S. (Tonan Hosp., Sapporo, Japan) and N. Iwasaki. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2): 322-331, 1970.

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1218 RADIOGRAPHY OF THE STOMACH AND DUODENUM USING TRIMEBUTIN. (Fr.) Ramee, A. (CHR Radiol. Serv., Rennes, France) and D. Hery. *Ouest Med.* 24(2):131-138, 1971.

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1227 THE ANGLE PRONE PROJECTION: ITS VALUE IN DIAGNOSIS OF LOW-LYING LESIONS. (E.) Wener, L. (Cafritz Mem. Hosp., Washington, D. C.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):393-398, 1970.

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1229 UNRAVELLING THE TANGLED SIGMOID. ROUTINE ANGULATION OF THE TUBE IN THE DETECTION OF OCCULT LESIONS. (E.) Perl, T. (Upstate Med. Ctr., Syracuse, N. Y.) and W. Goldman. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2): 399-405, 1970.

1230 A SAFER ENEMA NOZZLE. (E.) Mattsson, O. (Ersta Hosp., Stockholm, Sweden). *Acta Radiol. [Diagn.] (Stockh.)* 10(6):557-560, 1970.

1231 ROENTGENOGRAPHIC APPEARANCE OF CANINE HISTIOCYTIC ULCERATIVE COLITIS. (E.) Lawson, T. L. (U. California Sch. Med., San Francisco), J. A. Gomez and E. T. Stewart. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2): 377-384, 1970.

1232 ARGENTINE SOCIETY OF GASTROENTEROLOGY COMMITTEE FOR STANDARDIZATION OF LABORATORY TESTS IN GASTROENTEROLOGY. SECTION: PANCREAS. (Sp.) Tiscornia, O. M. *Sem. Med. (B. Aires)* 136(40):1427-1440, 1970.

1233 PRIMATE LIVER AND SPLEEN BIOPSY PROCEDURES. (E.) Voss, W. R. (Baylor Coll. Med., Houston, Tex.). *Lab. Anim. Care* 20(5):995-997, 1970.

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1248 SPLENOPORTOGRAPHY USING LIPIODOL. EXPERIMENTAL ANIMAL STUDIES. (Hun.) Palvolgyi, L. (City Polyclin. Hosp., Komlo, Hungary), A. Laczay and I. Kadas. *Orv. Hetil.* 111(27):1591-1593, 1970.

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1257 ORAL CHOLECYSTOCHOLANGIOGRAPHY WITH OCCLUSION OF ODDI'S SPHINCTER AS A ROUTINE EXAMINATION PROCEDURE. (It.) Monfreda, G. (Gen. Provincial Hosp., Bassano Del Grappa, Italy) and G. Trevisan. *Quad. Radiol.* 35(5): 483-502, 1970.

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1260 THE VALUE OF OPERATIVE CHOLANGIOGRAPHY USING AN IMAGE INTENSIFIER AND A TELEVISION MONITOR. (E.) Grace, R. H. (St. Thomas' Hosp., London) and V. G. Peckar. *Medica Mundi* 15(3):109-114, 1970.

1261 X-RAY EXAMINATION OF THE GALLBLADDER IN GENERAL PRACTICE. (Ger.) Bopp, J. (Gen. Dist. Hosp., Bielefeld, Germany). *Diagnostik* 3(9):230-233, 1970.

1262 ROENTGENOGRAPHIC EVALUATION OF PATIENTS WITH SUSPECTED OBSTRUCTIVE JAUNDICE. (E.) Redman, H. C. (Wayne County Gen. Hosp., Eloise, Mich.), S. R. Reuter and R. R. Joseph. *Surg. Gynecol. Obstet.* 131(6):1100-1104, 1970.

1263 ANGIOGRAPHY OF THE DIGESTIVE TRACT. (Sp.) Pinchuk, L. A. *Sem. Med. (B. Aires)* 137(8):280-281, 1970.

1264 ARTERIOGRAPHY IN GASTROINTESTINAL DISEASES. (Fr.) Helenon, C. (Tenon Hosp., Paris). *Cah. Med.* 11(14):1165-1189, 1970.

1265 THE USE OF AORTOGRAPHY IN THE DIAGNOSIS OF ABDOMINAL MASSES IN CHILDREN. (E.) Moes, C. A. F. (U. Toronto Dept. Radiol., Canada) and J. D. Burrington. *Radiology* 98(1):59-67, 1971

1266 ANGIOGRAPHY IN THE DIAGNOSIS OF CHRONIC GASTROINTESTINAL BLEEDING. (E.) Klein, H. J. (Cleveland Clin. Found., Ohio), R. J. Alfidi, T. F. Meaney and V. C. Poirier. *Radiology* 98(1):83-91, 1971.

1267 RADIOLOGICAL EXAMINATION OF HEMORRHAGES OF THE UPPER GASTROINTESTINAL TRACT. (Rum.) Birzu, I. (Radiol. Clin., Bucharest, Rumania) and I. Jocu. *Viata Med.* 17(13):581-584, 1970.

1268 MEASUREMENT OF FECAL FAT ACCORDING TO THE PRINCIPLE OF THE CAPACITY CHANGE OF A CONDENSOR. (Ger.) Willig, F. (Univ. 1st Med. Clin., Mannheim, Germany), W. Korber and H. Cornelius. *Z. Gastroenterol.* 8(5):304-311, 1970.

1269 THE ANGIOGRAPHIC APPEARANCE OF HYDATID DISEASE. (E.) Baltaxe, H. A. (Cornell Med. Ctr., New York, N. Y.) and R. J. Fleming. *Radiology* 97(3):599-604, 1970.

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See also numbers: 1012, 1716

GASTROINTESTINAL DISEASES

ESOPHAGUS

1271 MANAGEMENT OF RECURRENT HIATAL HERNIA. (E.) Hill, L. D. (Mason Clin., Seattle, Wash.). *Arch. Surg.* 102(4):296-302, 1971.

Preoperative combined pH and pressure studies and a series of radiographs of the gastrointestinal tract were done on 63 patients with recurrent hiatal hernia. All patients demonstrated reflux by pH and pressure study, and most demonstrated reflux by the series of X-rays. The two common factors present in all of these patients who had previously had surgery were failure to properly anchor the stomach in its infradiaphragmatic position, and failure to correct reflux. Fixation sutures were either not employed, improperly placed, or placed in tissue that did not hold. Failure to correct reflux was often related to an inadequate attempt to narrow the cardio-esophageal opening or failure to permanently fix the sphincter mechanism in its proper place. Complications and symptoms were not corrected by vagotomy, pyloroplasty, or gastric resection when reflux was not corrected. Posterior gastropexy was performed using the median arcuate ligament and calibration of the cardia, with good to excellent results in 81% of the cases. Recurrent herniation was not observed in any of the 60 patients followed-up for an average of 3.3 yr.

1272 THE ASSESSMENT OF OESOPHAGITIS IN HIATUS HERNIA PATIENTS. (E.) Ward, A. S., D. H. Wright and J. L. Collis (Med. Sch., Birmingham, England). *Thorax* 25(5):568-572, 1970.

Endoscopy, biopsy, and radiological examination were used to determine the incidence of esophagitis in 108 patients with sliding hiatus hernia, and these findings were then correlated with clinical symptoms. The incidence of esophagitis was 76.9% as observed with esophagoscopy, 56.2% on biopsy, and 58.3% at barium swallow. The most satisfactory method of assessment proved to be endoscopy, since biopsies were generally inadequate or correlated poorly with clinical criteria; radiological criteria were only useful in severe cases. Main clinical features observed were pain, dysphagia, heartburn, regurgitation, and bleeding. A relation between heartburn and esophagitis could not be demonstrated. Inflammatory change was observed in 87.2% of the patients with dysphagia, while endoscopic esophagitis was seen in 75% of the patients who reported specific retrosternal pain and in 60% of those with heartburn and regurgitation.

1273 THE ASSOCIATION OF SYMPTOMATIC HIATUS HERNIA AND PYLORIC PATHOLOGY. (E.) Paulino, F. (U. Rio de Janeiro, Brazil) and A. Roselli. *Am. J. Gastroenterol.* 54(6):557-579, 1970.

Unsuspected small pyloric peptic ulcers were observed in several patients with symptomatic hiatus hernia, high gastric acidity, and esophagitis, and should be suspected in patients with hiatus hernia, esophagitis and no evidence of pyloric disease. Fundic gastric mucosa was found in the duodenum and pylorus in 4 patients with hiatus hernia, but normal pyloric function, in whom the symptoms became rapidly and progressively worse despite good medical management The physiologic relation between severe clinical symptoms in some patients with hiatus hernia and the presence of fundic gastric mucosa in the duodenum and the pylorus is obscure, although the high incidence of this association in the present series establishes it as a pertinent clinicopathological feature.

1274 LOWER ESOPHAGEAL SPHINCTER RESPONSE TO GASTRIC ALKALINIZATION. A NEW MECHANI FOR TREATMENT OF HEARTBURN WITH ANTACIDS. (E.) Castell, D. O. (US Naval Hosp., Philadelphia, Pa.) and S. M. Levine. *Ann. Intern. Med.* 74(2): 223-227, 1971.

Hydrochloric acid (0.1 N) administered in a flui filled catheter consistently decreased lower esophageal sphincter pressure. The subsequent instillation of either 0.1 N sodium bicarbonate, 0.1 N sodium hydroxide, or a commercial antacid preparation also increased sphincter pressure values. Gastric alkalinization in 6 patients with an incompetent sphincter also increased lower esophageal sphincter pressure values. Thi effect is apparently produced by the release of endogenous gastrin from the gastric antrum. Alkali seemingly has a dual effect in the treatm of heartburn not only by neutralizing the gastri acid, but also by causing a significant increase in the lower esophageal sphincter pressure barri

1275 UTILIZATION OF THE MEDIAN ARCUATE LIGAMENT IN THE REPAIR OF HIATAL HERNI (E.) Howard, P. M. (U. Utah Gen. Surg. Serv., Salt Lake City) and M. Wertheimer. *Am. J. Surg.* 120(5):607-609, 1970.

1276 THE EFFECT OF MUCAINE ON REFLUX OESOPHAGITIS. A STUDY USING OESOPHAGE PERFUSION TEST. (E.) Barker, J. R. (Hammersmit Hosp., London) and J. Spencer. *Br. J. Clin. Pract.* 24(10):417-418, 1970.

1277 GASTROESOPHAGEAL VARICES: COMPARISON OF ESOPHAGOGRAPHY AND SPLENOPORTOGRAPH WITH TRADITIONAL RADIOLOGICAL METHODS. (It.) Piazza, G. (U. Padua Radiol. Inst., Italy), F. Bidoli and G. Marin. *Quad. Radiol.* 35(2-3-4): 351-371, 1970.

1278 COMPLETE ATRAUMATIC RUPTURE OF THE TERMINAL ESOPHAGUS (BOERHAAVE SYNDROME

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1279 METHODS OF REMOVING FOREIGN BODIES FROM THE ESOPHAGUS AND AIR PASSAGES. (Fr.) Triglianos, A. (Hosp. Pediatr. Dis., Athens, Greece). *Ann. Otolaryng. Chir. Cervicofac.* 87(10-11):687-688, 1970.

1280 INFLAMMATORY POLYP: A COMPLICATION IN ESOPHAGUS LINED BY COLUMNAR EPITHELIUM. (E.) Eller, J. L. (Fitzsimons Gen. Hosp., Denver, Colo.), F. M. H. Ziter, Jr., T. F. Zuck and W. Brott. *Radiology* 98(1):145-146, 1971.

1281 PARAESOPHAGEAL CYST IN A 7-WEEK-OLD INFANT. (Fr.) Caron, J., R. Delaitre and R. Testard. *J. Radiol. Electrol. Med. Nucl.* 51(5):295-296, 1970.

1282 NEW SURGICAL METHOD FOR TREATING MEGA-ESOPHAGUS. (Por.) Serra Doria, O. B. (Sao Paulo, Brazil), M. O. M. Silva Doria and O. R. Silva Doria. *An. Paul. Med. Cirurg.* 97(2):115-121, 1970.

1283 UNUSUAL CASE OF INTRALUMINAL MALFORMATION OF THE ESOPHAGUS PRESENTING AS DIVERTICULUM. (It.) Meneghini, C. (U. Padua Inst. Radiol., Italy), F. Bidoli and P. Bortolami. *Quad. Radiol.* 35(2-3-4):335-341, 1970.

1284 GLYCOGENIC ACANTHOSIS OF THE ESOPHAGUS. (E.) Rywlin, A. M. (Mt. Sinai Hosp. Greater Miami, Fla.) and R. Ortega. *Arch. Pathol.* 90(5):439-443, 1970.

1285 LEIOMYOMA OF THE ESOPHAGUS. (E.) Dillow, B. M. (U. Nebraska Coll. Med., Omaha), D. D. Neis and R. D. Sellers. *Am. J. Surg.* 120(5):615-619, 1970.

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1287 CARBOHYDRATE METABOLISM IN MALIGNANT TUMORS OF THE ESOPHAGUS AND STOMACH. (Rus.) Liutynskii, I. I. *Vestn. Khir.* 105(7): 23-27, 1970.

1288 RESULTS OF RADIOTHERAPY IN CANCER OF THE ESOPHAGUS WITH REFERENCE TO 300 CASES IN 10 YEARS. (Fr.) Verhaeghe, M, J. Rohart and L. Adenis. *Lille Med.* 15(6):901-910, 1970.

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1290 RADIOLOGICAL PHYSIOPATHOLOGY OF ESOPHAGEAL DISEASE. CARCINOMA AND AGING OF THE ESOPHAGUS. (Jap.) Kobayashi, T. (Shinshu U. Sch. Med., Fukuoka, Japan). *Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.)* 30(5):393-413, 1970.

1291 HAZARDS OF SUBSEQUENT CARCINOGENESIS IN CAUSTIC STENOSIS OF THE ESOPHAGUS. (Fr.) Gaillard, J. (Edouard Herriot Hosp., Lyon, France), M. Bouchayer and J. P. Haguenauer. *Ann. Otolaryng. Chir. Cervicofac.* 87(10-11): 637-643, 1970.

1292 PEMPHIGUS AND ESOPHAGEAL STENOSIS. (Fr.) Triglianos, A. (Hosp. Thoracic Dis., Athens, Greece). *Ann. Otolaryng. Chir. Cervicofac.* 87(10-11):663-667, 1970.

1293 EVALUATION OF A METHOD FOR RECONSTRUCTION OF THE ESOPHAGOGASTRIC JUNCTION, AND THE APPLICATION TO ACHALASIA. (Rev.) (E.) Hirashima, T. (U. Chiba Sch. Med., Japan) and H. Sato. *Ann. Surg.* 172(5):897-901, 1970.

1294 ACHALASIA OF THE ESOPHAGUS IN INFANCY. CASE REPORT. (E.) Magilner, A. D. (Albert Einstein Med. Ctr., Philadelphia, Pa.) and H. J. Isard. *Radiology* 98(1):81-82, 1971.

1295 COMBINED DUPLICATION OF THE ESOPHAGUS AND STOMACH. (E.) Moir, J. D. (St. John Gen. Hosp., New Brunswick, Canada). *J. Can. Assoc. Radiol.* 21(4):257-262, 1970.

See also numbers: 1193, 1194, 1299, 1609

1296 NEOPLASTIC ARGENTAFFIN CELLS IN GASTRIC AND INTESTINAL CARCINOMAS. (E.) Kubo, T. (Palmerston North Hosp., New Zealand) and H. Watanabe. *Cancer* 27(2):447-454, 1971.

The frequency of tumors classified as "carcinoma and adenocarcinona with included argentaffin cells" among ordinary gastric and intestinal carcinomas was studied by histochemical examination for argentaffin cells in specimens of 382 gastric and 81 intestinal carcinomas. Gastric and intestinal carcinomas contained 3.1% and 2.5% argentaffin cells, resp., as an integral element of the tumor. These cells were most often encountered in diffuse carcinoma of the stomach, and the term diffuse argentaffinoma is suggested as a descriptive name. Diffuse carcinoma with argentaffin cells may have biological activity as a functioning tumor corresponding to that of classical carcinoid tumors.

1297 RADIOLOGICAL FEATURES OF THE STOMACH AFTER FUNDECTOMY. (E.) Lehtinen, E. (Cent. Hosp., Tampere, Finland). *Ann. Chir. Gynaecol. Fenn.* 59(4):202-207, 1970.

Variations in postoperative radiological findings following fundectomy for carcinoma of the cardia are reported. Results with postoperative X-irradiation varied according to the amount of stomach removed, which was determined by the extent of the carcinoma. Shrinkage of the anastomosis and the new cardia area often caused esophageal reflux. Filling defects due to the length of the resection line and pouches caused by the sutures were also observed; these pouches filled with contrast medium, and thus simulated defects in the anastomotic line.

1298 STUDY OF FAT ABSORPTION AFTER GASTRIC SURGERY USING A FATTY TEST MEAL. (E.) Keynes, W. M. (Radcliffe Infirm., Oxford, England) and W. A. F. Penfold. *Ann. Surg.* 173(3):363-371, 1971.

In 45 patients who underwent various forms of surgery including truncal vagotomy and pyloroplasty, vagotomy and gastrojejunostomy, Billroth I, and partial gastrectomy, decreased fat absorption was seen only in those who had such symptoms before surgery or who underwent total gastrectomy. Since no filtered fat absorption was found in patients after surgery for ulcer, the increased fecal fat sometimes seen after gastric surgery may be due to increased endogenous fat excretion, rather than to decreased dietary absorption of fat.

1299 HETEROTOPIA AND ECTOPIA OF GASTRIC EPITHELIUM PRODUCED BY MUCOSAL WOUNDING IN THE RAT. (E.) Wong, J. and E. S. Finckh (U. Sydney Dept. Pathol., Australia). *Gastroenterology* 60(2):279-287, 1971.

Repeated, asymmetrical and deep mucosal wounding at the region of the junction of the squamous-lined forestomach and the columnar-lined glandular stomach in the rat produced deviation of the junction to the side where more mucosa had been damaged. The extent of deviation was greater when predominantly glandular mucosa was wounded. Repeated injury across projections of glandular epithelium in the squamous part of the stomach narrowed the center of the projection until continuity of glandular epithelium was lost, and squamous epithelium isolated the tip of the original projection of displaced glandular epithelium. When wounds were made across displaced squamous epithelium in the glandular part of the stomach, healing resulted in similar changes, but islands of squamous epithelium were produced far less readily. Another pattern of wounding resulted in the encirclement of portions of glandular mucosa by squamous epithelium, and the formation of pseudoectopias. By contrast with true ectopias (displaced squamous epithelium had an abnormally serrated lower margin where it adjoined the lamina propria), such areas had normal histology and acid secretion. Experimental production of heterotopic and ectopic areas of gastric mucosa by repeated trauma may be relevant in the pathogenesis of similar abnormalities in man.

1300 GASTRIC LESIONS PRODUCED BY CINCHOPHEN IN THE FERRET. (E.) Umeda, N. (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia), J. L. A. Roth and C. J. Pfeiffer. *Toxicol. Appl. Pharmacol.* 18(1):102-113, 1971.

Adult female ferrets were sacrificed from 3 hr to 35 days after being treated with cinchophen by daily gastric intubation of 220 mg/kg, 5 days/week. This agent produced marked gastritis and ulceration as shown by acute exudative changes in the body and antrum of the stomach within 3 hr; these progressed mainly in the antrum within 3-4 days and included multiple, linear or irregular, deep or shallow erosions, and marked edema and infiltration of polymorphonuclear cells between the glands and in the submucosa. Changes decreased by 7 days and reappeared after 14-35 days. In ferrets injected i.p. with a single dose of 220 mg/kg, there were no changes in gastric acid concentration or pepsin activity in the 3-hr period following injection. Only slight acute inflammatory changes followed direct administration of cinchophen into antral pouches, and no antral changes followed p.o. administration of the drug. It is concluded that the ulcerogenic properties of cinchophen depend upon the concomitant presence of gastric acid.

1301 THE ELECTROLYTES OF ALKALINE HUMAN GASTRIC JUICE. (E.) Gardham, J. R. C. (Middlesex Hosp., London) and M. Hobsley. *Clin. Sci.* 39(1):77-87, 1970.

Electrolytes were determined in 15-min samples of alkaline gastric juice from 11 patients (4 men and 7 women, aged 59-76 yr) with pernicious anemia (6 cases), atrophic gastritis (2 cases), stomach ulcer (2 cases), and duodenal ulcer (1 case). Samples were taken under basal conditions or after stimulation with histamine diphosphate (0.04 mg/kg/hr i.v.) or betazole (50 mg s.c.). Histamine-resistant achlorhydria was present in 7 cases. Electrolyte concentrations varied greatly from one subject to another: Na^+ concentrations ranged from 48-146 mEq/liter, K^+ concentrations from 11-27 mEq/liter, Cl^- concentrations from 56-147 mEq/liter, and HCO_3^- concentrations from 3-18 mEq/liter. Decreasing concentrations of Na^+, Cl^-, and HCO_3^- were correlated with increasing K^+ concentrations. These varying electrolyte concentrations can be accounted for by the dilution of pure alkaline gastric juice by varying quantities of saliva in different subjects. Assuming that the composition of saliva remains constant, it appears that the electrolyte composition of gastric juice is approximately the same in all subjects, and resembles the alkaline component that has been predicted theoretically. These results and other data in the literature suggest that the alkaline component of gastric juice is not dependent upon the rate of acid secretion.

1302 DUPLICATIONS OF STOMACH. A REPORT OF 2 CASES. (E.) Bhasin, R. P. (Maulana Azad Med. Coll., New Delhi, India) and K. S. Satyanand Mehdiratta. *Indian J. Surg.* 32(5): 269-271, 1970.

1303 LACTOBEZCAR AND GASTRIC PERFORATION IN A NEONATE. (E.) Levkoff, A. H. (Med. U. South Carolina, Charleston), R. H. Gadsden, G. R. Hennigar and C. M. Webb. *J. Pediatr.* 77(5):875-877, 1970.

1304 CARCINOGENESIS OF THE GASTRIC MUCOSA. (Slovene) Lenart, I. (Inst. Pathol. Morphol., Ljubjana, Yugoslavia), I. Matko and M. Acko. *Zdrav. Vestn.* 39(Suppl. 1):22-24, 1970.

1305 IRREGULAR DISTRIBUTION OF THE ANTIGENIC EPITHELIAL GLYCOPROTEIN IN GASTRIC CANCER. (E.) Kawasaki, H. (Kurume U. Sch. Med., Japan), K. Imasato and E. Kimoto. *Kurume Med. J.* 17(3):121-129, 1970.

1306 PROGRESS IN THE DIAGNOSIS OF EARLY GASTRIC CARCINOMA. (Rev.) (Rum.) Fodor, O. (IMF 3rd Med. Clin., Cluj, Rumania) and S. Popescu. *Med. Interna (Bucur.)* 22(6):727-735, 1970.

1307 PATHOLOGY AND PROGNOSIS OF CARCINOMA OF THE STOMACH. (E.) Hawley, P. R. (St. Mark's Hosp., London), P. Westerholm and B. C. Morson. *Br. J. Surg.* 57(12):877-883, 1970.

1308 CLINICAL AND PATHOLOGIC STUDIES OF EARLY STOMACH CANCER. (Jap.) Monma, R. (Kanazawa Natl. Hosp., Ishikawa, Japan), M. Mai and K. Yamato. *Iryo* 24(5):373-379, 1970.

1309 DEVELOPMENT OF STOMACH CANCER. RETROSPECTIVE ANALYSIS OF CLINICAL OBSERVATIONS. (Fr.) Kawai, K. (Kyoto Prefect. Med. U., Japan), Y. Kohli, F. Misaki and Y. Murakami. *Ann. Gastroenterol. Hepatol. (Paris)* 6(3):217-223, 1970.

1310 MACROSCOPIC DIAGNOSIS OF MINUTE GASTRIC CANCER. (Jap.) Takagi, K. (Cancer Inst. Hosp., Tokyo). *Stomach Intest. (Tokyo)* 5(8):939-949, 1970.

1311 STATISTICS ON VERY SMALL GASTRIC CARCINOMAS (UNDER 1 CM ON DIAMETER) DIAGNOSED PREOPERATIVELY, BASED ON THE RESULTS OF A QUESTIONNAIRE AT 24 INSTITUTIONS IN JAPAN. (Jap.) Editorial. *Stomach Intest. (Tokyo)* 5(8):995-998, 1970.

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1313 PRIMARY GIANT FOLLICULAR LYMPHOMA OF THE STOMACH. (Ser.) Kusic, M., A. Ceramilac and M. Bervar. *Vojnosanit. Pregl.* 27(7-8):343-345, 1970.

1314 RARE CASE OF STOMACH HEMANGIOSARCOMA ASSOCIATED WITH SPLENOMEGALY. (Rus.) Senchilo, E. A. and V. P. Teodorovich. *Vestn. Khir.* 105(8):118-119, 1970.

1315 SOIL, WATER, AND CARCINOMA OF THE STOMACH IN THE DISTRICT SERVED BY THE TRNOVO ONCOLOGICAL DISPENSARY. (Bul.) Manoilov, K. P. *Onkologia* 7(3):97-101, 1970.

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1319 AUTOIMMUNE PROCESSES IN THE PATHOGENESIS OF CHRONIC GASTRITIS. (Rev.) (Ger.) Reitzig, P. (Humboldt U. 1st Med. Clin., Berlin, Germany), E. Apostoloff and G. Lisewski. *Dtsch. Gesundheitsw.* 25(41):1917-1921, 1970.

1320 SIMPLE ATROPHIC GASTRITIS AND GASTRIC PARIETAL CELL ANTIBODIES. (Rev.) (It.) Masala, C. (U. Florence Inst. Spec. Med. Pathol., Italy), A. M. Pala and F. Andreoli. *Folia Allergol. (Roma)* 17(1):30-45, 1970.

1321 METOCLOPRAMIDE AS SYMPTOMATIC THERAPY IN GASTROINTESTINAL DISORDERS. (Fr.) Zega, S. N. (Alexandru Sahia Hosp., Bucharest, Rumania), G. Schmitzer and G. Radulescu. *J. Med. Chir. Prat.* 141(32-33):1107-1116, 1970.

1322 ASPIRIN, ETHANOL AND THE STOMACH. (Rev.) (E.) Cooke, A. R. (Roy. Prince Alfred Hosp., Camperdown, Australia). *Australas. Ann. Med.* 19(3):269-274, 1970.

1323 GASTRIC MUCOSAL ULCERATION AFTER EPINEPHRINE. A STUDY OF ETIOLOGIC MECHANISMS. (E.) Sethbhakdi, S. (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia), J. L. A. Roth and C. J. Pfeiffer. *Am. J. Dig. Dis.* 15(12): 1055-1065, 1970.

1324 MICROTRANSILLUMINATION IN STOMACH SURGERY. (Rus.) Sorokin, S. S. *Vestn. Khir.* 105(11):57-60, 1970.

1325 USE OF RADIOIODINE TO EVALUATE STOMACH SECRETION AFTER STOMACH SURGERY. (Rus.) Kevesh, E. L., A. M. Aminev and A. M. Bykhovskaia. *Med. Radiol. (Mosk.)* 16(2):15-18, 1971.

1326 REINTEGRATION OF THE DUODENUM INTO THE GASTROINTESTINAL TRACT IN THE TREATMENT OF POSTGASTRECTOMY SYNDROME. (Rev.) (Rum.) Ionescu-Carus, B. (Dr. C. Davilla Hosp., Bucharest, Rumania), R. Pretorian and A. Grigorescu. *Chirurgia (Buc.)* 19(7):633-639, 1970.

1327 PROLAPSED GASTRIC MUCOSA THROUGH A GASTROJEJUNOSTOMY. (E.) Seaman, W. B. (Columbia U. Coll. Physicians Surg., New York, N. Y.). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):304-314, 1970.

See also numbers: 1211, 1212, 1215, 1219, 1220, 1295, 1352, 1683

PEPTIC ULCERS

1328 A METHOD FOR EXPERIMENTAL, PENETRATING GASTRIC AND DUODENAL ULCERS IN RATS. OBSERVATIONS ON NORMAL HEALING. (E.) Okabe, S., J. L. A. Roth and C. J. Pfeiffer (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia). *Am. J. Dig. Dis.* 16(3):277-284, 1971.

Using a round metal mold, 0.07 ml of 100% acetic acid was permitted to remain in contact with the gastric serosa for 60 sec and with the duodenal serosa for 30 sec in male Sprague-Dawley rats. Animals were sacrificed at variable intervals for the next 100 days. An ulcer index (1-5) was calculated on the basis of both surface area and depth of ulcer. Immediately after application of acetic acid, the antral and fundic serosa blanched due to apparent damage to local superficial vessels, while the underlying mucosa appeared normal. After 30-60 min, the mucosal surfaces showed severe necrosis with hemorrhages evident on the margins of the lesions. After 24 hr, there was discrete mucosal ulceration, the surface was thickly covered with mucus, and severe thromboses appeared in the submucosa. By 3 days, there was obvious ulceration at each treated site with penetration of the entire wall. By day 5, antral and fundic ulcers were sharply defined; in the duodenum, ulcers were an average of 3 mm deep and about 5 x 6 mm in dimension. At this time, these ulcers showed some penetration of adjacent organs. Fundic and duodenal ulcers decreased in size from days 10-60, and were all completely healed within 80 days. Relatively large antral ulcers were still seen after 80-100 days in over 50% of the rats. Only antral ulcers showed glandular cysts in the margin or base.

1329 DIFFERENTIAL HEALING PERIODS OF THE ACETIC ACID ULCER MODEL IN RATS AND CATS. (E.) Okabe, S. (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia), J. L. A. Roth and C. J. Pfeiffer. *Experientia* 27(2):146-148, 1971.

Production of acetic acid-induced gastric ulcers in rats was histologically confirmed; these ulcers persisted for at least 200 days. Experimental ulcers in rats apparently underwent partial healing and recurrent ulceration under chronic conditions, since large ulcers were still observed after 200 days. In contrast, gastric ulcers produced in cats were similar in appearance initially, and of similar size in proportion to the stomach as those in rats, but completely healed after 35 days. In the present study, the antral region was selected in the cat because human ulcers situated on the antrum are, frequently, chronic lesions. However, the rat fundus was chosen because of the very small size of the rat stomach. The chronic nature of the gastric ulcer in rats is not necessarily related to the acetic acid itself, but to a special characteristic of the rat. As the chronic nature of the experimental, acetic acid ulcer model in the rat uniquely resembles human peptic ulcer, this model may be quite useful for the study of human ulcers and the evaluation of pharmacologic agents used for treating this disease.

1330 ACTION OF LYCOPENE IN THE EXPERIMENTAL GASTRIC ULCER. (E.) Milani, C. (Pro-Ter Co. Lab. Pharmacol., Milan, Italy), M. Maccari and P. Mosconi. *Pharmacology* 4(6):334-340, 1970.

The anti-ulcer activity of lycopene was tested in 3 types of experimentally-induced gastric ulcers in mice, rats, and guinea pigs. Lycopene (50 mg/kg p.o. or s.c.) showed moderate, but significant, protection in pylorus ligation-induced ulcers. While lycopene (20 mg/kg) had no effect on histamine-induced ulcer in the guinea pig when administered s.c., the same dose proved efficient in animals treated p.o. Only at a dose of 100 mg/kg s.c. did lycopene provide protection from ulcer development in immobilized rats.

1331 AN ENDOSCOPIC EVALUATION OF GASTRIC ULCER TREATED WITH A MIXTURE CONTAINING BISMUTH AMMONIUM CITRATE. (E.) Lanza, F. L. (U. Texas M. D. Anderson Hosp. Tumor Inst., Houston). *Curr. Ther. Res.* 12(12):779-788, 1970.

Of 10 patients treated with a mixture containing bismuth ammonium citrate and belladonna alkaloids, 8 experienced healing of their ulcers as demonstrated by gastroscopy and intragastroscopic photography. Most ulcers healed within a period of 4 weeks. The majority of patients whose ulcers healed experienced good symptomatic relief on the test material. No side effects were noted except for occasional black discoloration of the tongue and temporary darkening of the stools, probably due to residual bismuth sulfide. Apparently, this form of therapy requires no strict dietary regimen after the first few days, and can be administered on an out-patient ambulatory basis. Being a single medication, it is probably more economic than the usual regimens which may include antacids, special diet, anticholinergic agents, or tranquilizers. In 2 patients, after the administration of the test material, the ulcer crater appeared white and glistening, in contrast to the usual yellow, necrotic base seen in gastric ulcers; the significance of this change is unknown.

1332 THE EFFECT OF METACLOPRAMIDE (PRIMPERAN) ON GASTRIC MOTILITY BEFORE AND AFTER VAGOTOMY IN MAN. (E.) Stadaas, J. (Ulleval Hosp., Oslo, Norway) and S. Aune. *Scand. J. Gastroenterol.* 6(1):17-21, 1971.

Measurements of intragastric pressure were made in 16 patients with duodenal ulcers, both before and after injection of metoclopramide (30 mg i.v.). Of a total of 18 recordings, 5 were made before and 13 after complete vagotomy. In normal stomachs, the effect of metoclopramide was seen within 2 min after injection and persisted for 20-30 min. There was an initial elevation of the basal pressure of about 3 cm H_2O, and this was seen as a slow pressure wave resembling the gastric pressure wave (type III). Coincident with this change was an increased frequency of pressure peaks, but there was no significant change in basal gastric pressure with changes in gastric volume. In vagotomized patients, the effect was again seen within 2 min, and was characterized by a marked, but transient increase in the basal pressure (type III). Pressure peaks recurred at the normal rate, reflecting peristaltic waves. The amplitude of the waves was less than that in stomachs of nonvagotomized patients, and was not affected by changes in gastric volume. The inital response subsided within 5-10 min, after which the basal pressure remained constant within the normal range.

1333 THE EFFECT OF PHTHALAPROMINE [3,3-DIMETHYL-1-(3-METHYLAMINOPROPYL)-1-PHENYLPHTHALANE] (LU 3-010) ON GASTRIC MOTILITY IN MAN. (E.) Stadaas, J. (Ulleval Hosp., Oslo, Norway) and S. Aune. *Scand. J. Gastroenterol.* 6(1):23-27, 1971.

Measurements of intragastric pressure were made in 7 patients with duodenal ulcers both before and after injection of 3,3-dimethyl-1-(3-methyaminopropyl)-1-phenylphthalane (30 mg i.v.). Significant motor activity with strong gastric contractions was found in all patients at a gastric volume of 300 ml. Immediately after injection of the drug, peristalsis disappeared, but there were no changes in basal gastric pressure. Peristaltic waves began to reappear during the next hr after injection, beginning with feeble contractions interrupted by long intervals. Increases in intragastric volume were accompanied by increased gastric motility.

1334 DOSE DEPENDENCE OF INSULIN-ACTIVATED GASTRIC ACID SECRETION IN PATIENTS WITH DUODENAL ULCER BEFORE AND AFTER VAGOTOMY. (E.) Kronborg, O. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 6(1):33-38, 1971.

Increasing doses of insulin from 0.1-0.4 I.U./kg produced only insignificant changes in acid secretions, both pre- and postoperatively. The optimum dose for clinical use is apparently 0.2 I.U./kg, since it resulted in a higher acid response in the one patient given all 4 doses of insulin, and an insignificantly higher response in 14 than in 10 patients given 0.1 I.U. preoperatively. No inverse correlation was found between blood sugar and acid output comparing mean values, after 0.1-0.4 I.U./kg, but the insignificantly lower acid output and higher blood sugar after a 0.1 I.U. dose is consistent with such a correlation at lower doses.

1335 EFFECT OF TRUNCAL VAGOTOMY ON ACID AND PEPSIN RESPONSES TO HISTAMINE IN DUODENAL ULCER SUBJECTS. (E.) Rosato, E. F. (U. Pennsylvania Dept. Surg., Philadelphia), F. E. Rosato and B. MacFadyen. *Ann. Surg.* 173(1): 63-66, 1971.

Histamine stimulation tests were performed in 11 patients with duodenal ulcer before and 10-14 days after truncal vagotomy and pyloroplasty. Maximal acid secretory response to histamine acid phosphate (standard dose, 0.04 mg/kg/hr i.v.) was reduced 6-53% after vagotomy; response to supramaximal doses of histamine was 2 or more times the response to the standard dose. In 4 patients, the maximal acid response to supramaximal doses was greater than 90% of the prevagotomy level. Response reached prevagotomy levels or had not yet reached a plateau of acid output in 10 of the 11 patients. Postoperative pepsin secretion, in response to standard histamine doses, was less than 50% of the preoperative response in all but 1 patient, and supramaximal doses did not effectively restore response to preoperative levels. Increased histamine doses did not increase pepsin output in 4, and response returned to preoperative levels in only 1 of the 11 patients. These results suggest that cholinergic stimuli sensitize the human delomorphous cell and, to an even greater extent, the adelomorphous cell to histamine stimulation.

1336 THE LATE RESULTS OF MEDICAL AND SURGICAL TREATMENT FOR BLEEDING DUODENAL ULCER. (E.) Harvey, R. F. (Middlesex Hosp., England) and M. J. S. Langman. *Q. J. Med.* 39(156):539-547, 1970.

More patients treated medically for duodenal ulcer bleeding suffered a recurrent complication of hemorrhage or perforation than those treated surgically. A number of factors that could have caused such recurrent hemorrhage included the patient's age, sex, and history of complications prior to the index admission. The risk of recurrent complications in medically treated patients fell with the passage of time; it was also slightly lower in women than in men. The relapse rate was also higher in men who had had a previous ulcer complication. Apparently, this follow-up study has shown a reduced risk of recurrent hemorrhage or perforation in patients treated surgically compared to those treated conservatively.

1337 EFFECT OF VAGOTOMY ON SERUM GASTRIN IN PATIENTS WITH DUODENAL ULCERATION. (E.) Byrnes, D. J. (Garvan Inst. Med. Res., Sydney, Australia), L. Lazarus and J. D. Young. *Australas. Ann. Med.* 19(3):240-243, 1970.

Fasting serum gastrin levels were measured by radioimmunoassay in patients with duodenal ulcers (40), in postvagotomy patients (16), after atropine administration in patients with duodenal ulcers (2), and in normal controls (41). Levels of gastrin were elevated in those with duodenal ulcers. Significantly lower levels were seen in 8 patients who had undergone complete vagotomy than in those with incomplete vagotomy, other duodenal ulcer patients, or controls. Ulcers recurred in 3 with elevated levels of gastrin after incomplete vagotomy. In the 2 patients with active duodenal ulcer who received a single i.v. injection of 25 μg/kg of atropine sulfate, serum gastrin levels fell markedly in 2 min, and this suppression persisted during the next hr of observation.

1338 PYLORIC CLOSURE FOR DIFFICULT GASTRECTOMIES. (E.) Zikria, B. A. (Columbia U. Coll. Physicians Surg., New York, N. Y.), B. Bednarz and J. M. Ferrer. *Surgery* 69(1):29-33, 1971.

Mongrel dogs were subjected to subtotal (50%) gastrectomy and Hofmeister gastrojejunostomy. Three different closures were compared: Bancroft, normal duodenal, and one combined with excision of antral mucosa. Autopsy 1-8 weeks postoperatively and pressure testing showed that the pyloric closure was of equal strength and tightness to the normal duodenal closure, while the Bancroft closure was weaker and leaked somewhat. In a clinical series, hemigastrectomy, vagotomy, and pyloric stump closure were performed in 16 patients with chronic duodenal ulcer and a scarred duodenum, and all 16 patients fared well postoperatively with no detected complications from this type of stump closure.

1339 SURGICAL MANAGEMENT OF POSTGASTRECTOMY PROBLEMS. (E.) Jordan, G. L., Jr. (Baylor Coll. Med., Houston, Tex.). *Arch. Surg.* 102(4):243-259, 1971.

Nine patients with postgastrectomy dumping syndrome underwent surgery for the placement of a reversed jejunal segment between the stomach and either the jejunum or duodenum. Five of the 9 patients had excellent results and 4 had good results after surgery, all having maintained good nutrition on normal diets. Apparently the reversed segment serves to reconstitute, to some degree, the function of the pylorus. Chronic afferent loop obstruction, a purely mechanical problem, must be treated surgically because medical treatment is generally ineffective. The choice of procedure depends on the technical features encountered. In this series, patients were treated by simple entero-enterostomy, by reduction of the hernia and shortening of the afferent loop to prevent further herniation, and, in 2 patients, by interposition of an isoperistaltic loop between the stomach and duodenum. Five of 9 patients treated had excellent results, and 2 had good results. Afferent loop obstruction can be eliminated totally in contrast with treatment of efferent loop obstruction, where recurrent adhesive obstruction may occur. Treatment of postvagotomy diarrhea with a reversed jejunal segment in 4 patients gave good or excellent results; 1 patient treated by a reversed ileal segment did not have improved postvagotomy symptoms.

1340 THE SIGNIFICANCE OF THE CARDIOVASCULAR CHANGES IN THE PATHOPHYSIOLOGY OF SEVERE DUMPING PROVOKED BY APOMORPHINE.

(E.) Fenger, H. J. (Community Hosp., Copenhagen, Denmark), H. J. Ladegaard-Pedersen, F. Wiberg Jörgensen, E. Gudmand-Höyer and J. Christiansen. *Scand. J. Gastroenterol.* 6(1):87-92, 1971.

During an acute episode of dumping induced by a single s.c. injection of 0.5 mg apomorphine in 7 patients with peptic ulcers who had undergone partial gastrectomy, no significant changes were found in either cardiac output, arterial blood pressure, peripheral vascular resistance, central venous pressure, circulating protein mass, plasma volume, hematocrit, colloid osmotic pressure, serum osmolarity, or blood sugar levels. However, the observed attacks corresponded well to those occurring spontaneously in these patients, and those induced by a glucose load.

1341 THE EFFECT OF GASTRECTOMY ON SEROTONIN METABOLISM IN THE HUMAN PORTAL VEIN.

(E.) Reichle, F. A. (Temple U. Health Sci. Ctr., Philadelphia, Pa.), M. P. Brigham, R. M. Reichle and G. P. Rosemond. *Ann. Surg.* 172(4):585-594, 1970.

After ingestion of a hypertonic glucose solution, platelet-rich plasma serotonin levels showed a significantly greater increase in portal and peripheral venous blood from 6 nonanesthetized postgastrectomy patients than in 9 controls with normal pyloric sphincter function, although fasting serotonin levels were the same in both groups. All of the gastrectomized patients developed clinical dumping syndrome after glucose ingestion. Although hemoconcentration was consistently observed in all gastrectomized patients during dumping, serotonin changes were of a much greater magnitude, indicating that the observed changes in serotonin were not secondary to hemoconcentration. Changes in serotonin levels and in the hematocrit which occurred in gastrectomized patients were not related to the extent of gastrectomy or to the presence or absence of vagal function. These results confirm indirect experimental evidence that serotonin is released from the intestinal tract into the portal circulation during dumping. Perhaps because of altered serotonin metabolism, the serotonin in the portal circulation is not entirely detoxified by hepatic or pulmonary monoamine oxidase, and can then be recirculated to the muscularis layer of the intestine by way of the arterial system and could cause diarrhea. Increased plasma serotonin levels could also cause other vasomotor or gastrointestinal symptoms associated with dumping, but the role of other humoral factors, particularly bradykinin, cannot be ruled out.

1342 SERUM ACETYLCHOLINESTERASE ACTIVITY IN DUODENAL ULCER.

(E.) Fodor, O. (Inst. Public Health, Cluj, Rumania), S. Urcan, S. Popescu and D. Grigoras. *Am. J. Dig. Dis.* 16(1): 27-30, 1971.

Serum acetylcholinesterase activity was significantly lower in 50 male patients, aged 20-45 yr, with active duodenal ulcers than in 20 controls. In the 14 patients with a family history of peptic ulcer, the mean enzyme activity was lower, but not significantly lower, than that for the ulcer group as a whole. Continuous vagal hyperactivity associated with duodenal ulcer produces an increased quantity of acetylcholine, an excess of which probably blocks acetylcholinesterase activity. Loss of acetylcholinesterase activity may be a pathogenetic factor in duodenal ulcer and may play a role in the hereditary predisposition to this disease.

1343 RELATIONS BETWEEN SERUM GASTRIN LEVELS AND RATES OF GASTRIC HYDROCHLORIC ACID SECRETION.

(E.) Trudeau, W. L. and J. E. McGuigan (U. Florida Coll. Med., Gainesville). *N. Engl. J. Med.* 284(8):408-412, 1971.

In general, mean fasting serum gastrin concentration was inversely related to rates of both basal and maximum stimulated gastric acid secretion in 168 subjects (55 with duodenal ulcers, 9 with gastric ulcers, 69 with assorted gastrointestinal disorders, and 35 controls). Gastric acid secretion was stimulated by administration of either histamine acid phosphate (0.04 mg/kg s.c.) or betazole hydrochloride (1.5 mg/kg s.c.).

Patients receiving histamine were injected with tripelennamine (40 mg s.c.) 30 min before histamine administration. The mean basal and stimulated rates of gastric acid secretion for patients with duodenal ulcer were significantly greater than those for patients with gastric ulcer and for controls. Although the mean fasting serum gastrin concentration of duodenal ulcer patients did not differ significantly from that of controls, patients with gastric ulcers had a significantly higher value than either controls or duodenal ulcer patients. Possibly the higher serum gastrin levels in gastric ulcer patients reflect decreased intragastric H^+ concentrations, as has been proposed for patients with the more complete mucosal atrophy of pernicious anemia.

1344 GASTRIC SECRETION IN DUODENAL ULCER PATIENTS AFTER WEAK AND STRONG STIMULATION.

(Cz.) Palečková, M. (Bulovce Street Hosp., Prague, Czechoslovakia) and Z. Mařatka. *Cesk. Gastroenterol. Vyz.* 24(6):239-243, 1970.

Gastric acid secretion was studied in 220 duodenal ulcer patients (180 men and 40 women, aged 25-65 yr) and in 201 controls (172 men and 29 women, aged 34-68 yr) with other diseases. Free acid concentrations and acid outputs were determined under basal conditions and after stimulation with caffeine (500 mg p.o. through a stomach tube); histamine (1 mg s.c.); histamine chloride (0.2 mg s.c.); i.m. injection of an antihistamine followed by histamine (0.026 mg/kg s.c.); and crystalline insulin (0.2 U/ig i.v.). Both free acid concentrations and acid outputs were significantly higher in duodenal ulcer patients than in controls under basal conditions and after administration of all these stimulants. The submaximal histamine dose (1 mg) and insulin produced almost as much of an increase in gastric acid secretion as the maximal histamine dose (0.026 mg/kg) in ulcer patients, but acted only as weak stimuli in controls. This effect was more pronounced on the acid output than on maximum free acid values. Although it had previously been reported that hot baths stimulate gastric acid production by increasing endogenous histamine release, practically no differences were found between basal secretion and secretion measured after placing the subject in water at 45C for 15 min.

1345 EFFECT OF AMINOGUANIDINE, CHLORPROMAZINE AND NSD-1055 ON GASTRIC SECRETION AND ULCERATION IN THE SHAY RAT.

(E.) Radwan, A. G. (Al-Azhar U. Fac. Med., Cairo, UAR) and G. B. West. *Br. J. Pharmacol.* 41(1):167-169, 1971.

Aminoguanidine, an inhibitor of histaminase, slightly increased the frequency of gastric ulceration and the volume and acidity of gastric contents in rats with pyloric ligation (Shay procedure); the mean ulcer score did not differ from the control value. However, chlorpromazine, an inhibitor of imidazole-N-methyltransferase, significantly reduced both the extent of ulceration and the mortality rate in Shay rats. The volume of gastric contents and its total acidity were also significantly reduced. The severity and extent of ulceration was also reduced by α-(aminoxy)-6-bromo-m-cresol, although the volume and total acidity of gastric contents were only slightly decreased. It is possible that the beneficial effects of chlorpromazine result from its action of the CNS (a depressant action as used in psychotic cases), which thereby produces an antiemetic effect and protection from ulceration. A clinical trial for chlorpromazine in the treatment of human gastric ulcers is worthy of consideration.

1346 ANTRAL AND DUODENAL GASTRIN ACTIVITY IN NON-ULCER AND ULCER PATIENTS.

(E.) Emås, S. (Univ. Surg. Clin., Malmo, Sweden), I. Borg and B. Fyrö. *Scand. J. Gastroenterol.* 6(1):39-43, 1971.

Antral gastrin secretory activity in gastric ulcer patients was significantly less than that of nonulcer controls and duodenal ulcer patients, both of which had similar activities. The duodenal gastrin-like activity in the duodenal ulcer and nonulcer patients did not differ, and was about 33% of the antral activity. Duodenal activity was too low to be estimated in gastric ulcer patients. Since gastric ulcer is often associated with atrophic gastritis, the reduced antral gastrin activity in these patients may reflect a gastrin-producing cell atrophy. The high gastrin-like activity of the proximal duodenum might suggest resection of this segment in the surgical treatment of ulcer.

1347 THE EFFECT OF 2-DEOXY-D-GLUCOSE AND INSULIN STIMULATION OF THE SECRETION OF GASTRIC LIPASE.

(E.) Szafran, H. (Pediatr. Inst., Cracow, Poland), T. Popiela and Z. Szafran. *Scand. J. Gastroenterol.* 6(1):55-58, 1971.

Pre- and postvagotomy measurement of the activity of gastric lipase in gastric juice was made before and after stimulation in 27 patients with duodenal ulcer, either by administration of a 25% solution of 2-deoxy-D-glucose (50 mg/kg to 18 patients) or crystalline insulin (0.2 U/kg to 9 patients). In prevagotomy patients, both the volume and output of acid, lipase, and protein in gastric juice increased significantly after stimulation with the glucose solution and, to a lesser extent, with insulin. Postvagotomy, the response to stimulation was significantly reduced, although not abolished; there was significant reduction of basal and maximal output of acid and lipase, while the volume of gastric juice and total output remained essentially the same before or after vagotomy, and was only slightly ecreased after stimulation. Lipase and acid utput showed an overall correlation coefficient f 0.93 when measured in basal and stimulated ecretion, before and after vagotomy.

348 SIX-HOUR ESCAPE-AVOIDANCE WORK SHIFT AND PRODUCTION OF STOMACH ULCERS. (E.) aré, W. P. (VA Hosp., Perry Point, Md.). *J. omp. Physiol. Psychol.* 74(3):459-466, 1971.

scape-avoidance sessions with rats lasted 6 hr nd alternated with a 6-hr rest period for 21 ays. Response rate, body weight, food and water ntake, diurnal consummatory pattern, adrenal eight, and ulcer incidence were not significantly ifferent in experimental animals compared to ontrols. Only a small percentage (7.2%) of xperimental "executive" rats developed ulcers. reviously, the same 6/6 schedule generated a igh ulcer frequency in monkeys; thus, similar astrointestinal consequences should not be xpected simply on phylogenetic grounds. Neverheless, the value of the 6/6 avoidance schedule or producing ulcers, even in monkeys, is doubtful.

349 CONDITIONED FEAR AND GASTRIC PATHOLOGY IN A CONTINUING STRESS-REST PARADIGM N RATS. (E.) Gliner, J. A. (Bowling Green tate U. Dept. Psychol., Ohio) and K. M. Shemberg. . *Comp. Physiol. Psychol.* 74(1, Pt. 1):20-22, 971.

n a study of the effects of a continued stress-est pattern on ulcer production, rest periods ere modified by presenting rats with tones which ere paired with shock during stress periods. he conditioned group did not differ from the ther groups in number of ulcers produced, but ost less weight than controls which received no onditioning during the rest periods. Therefore, he hypothesis that ulceration may be suppressed s a function of the addition of conditioned fear o the rest period was not supported. Conditioned ear is probably not an effective dimension elative to increases or decreases in gastric athology, at least within the framework of highly tressful situations.

350 EFFECTS OF ACUTE AND CHRONIC STRESS SITUATIONS ON STOMACH ACIDITY IN RATS. E.) Mikhail, A. A. (U. Manitoba Dept. Psychol., innipeg, Canada). *J. Comp. Physiol. Psychol.* 4(1):23-27, 1971.

cute conditioned fear in pylorus-ligated rats id not change gastric juice volume, free acidity, r total acidity. In another experiment, rats eceived 7 days of stimulation by light and shock redictable or unpredictable), followed by urther stimulation during 14 hr of pylorus igation; these had significantly lower gastric cidity than control animals. Sympathetic ctivity associated with fear-provoking situations, particularly chronic ones, apparently suppresses, rather than promotes, gastric acidity. Stress situations other than those which are fear-provoking may be necessary for the development of hyperacidity and the subsequent formation of ulcers.

1351 CULLEN'S SIGN IN PERFORATED DUODENAL ULCER. (E.) Evans, D. M. (Roy. South Hants Hosp., Southampton, England). *Br. Med. J.* 1(5741):154, 1971.

A rare case of Cullen's sign (staining at the umbilicus) associated with perforation of a duodenal ulcer is presented. A 40-yr-old housewife had a 15-yr history of intermittent epigastric pain which was associated with anxiety and depression. There was generalized tenderness and rigidity of the abdomen, and an area of bruising and pronounced tenderness around the umbilicus. Following the infusion of dried plasma, her condition improved greatly. At laparotomy, a large perforation of a chronic anterior duodenal ulcer was observed; and although Cullen's sign is usually associated with acute pancreatitis, no evidence of this was found.

1352 ELECTRICAL ACTIVITY OF THE GASTRIC ANTRUM IN MAN. (E.) Kwong, N. K. (U. Sheffield Dept. Surg., England), B. H. Brown, G. E. Whittaker and H. L. Duthie. *Br. J. Surg.* 57(12):913-916, 1970.

Records of electrical activity of the gastric antrum from serosal electrodes in patients with gastroduodenal disease (duodenal ulcer, gastric ulcer, and gastric cancer) showed a marked increase in the irregularity of the tracing. Wave amplitude, impulse conduction time, and the shape of the wave form were not significantly different from control values. Only 2 of 5 patients showed an increase in mean frequency following vagotomy. Changes in the frequency of the electrical activity may arise from the irritation of the disease process which increases the rate in some patients and, in others, alters the frequency. Multiple tracings from several points along the stomach might allow the detection of any ectopic pacemaker in gastroduodenal disorders.

1353 RECENT FINDINGS ON THE PSYCHOPHARMACOLOGICAL TREATMENT OF DUODENAL ULCER. (Sp.) Galan Navarro, J. L. (Sch. Med., Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 31(6):617-624, 1970.

1354 RESULTS OF THE TREATMENT OF PEPTIC ULCER AND GASTRODUODENITIS WITH A COMBINATION OF METOCLOPRAMIDE AND β-GLYCYRRHETINIC ACID. (Sp.) Lopez Calderon Barreda, M. (Hermanos Aznar Clin., Madrid, Spain), F. Barado Sanchez and M. Garcia Perez. *Rev. Esp. Enferm. Apar. Dig.* 32(7):783-794, 1970.

1355 ANTACIDS. (Rev.) (E.) Stokes, J. F. *Practitioner* 206(1231):35-38, 1971.

1356 WHAT IS THE BEST ELECTIVE OPERATION FOR DUODENAL ULCER? (E.) Hallenbeck, G. A. (U. Alabama Sch. Med., Birmingham). *Can. Med. Assoc. J.* 103(12):1255-1262, 1970.

1357 GASTROINTESTINAL EFFECTS OF SELECTIVE AND TOTAL VAGOTOMIES. (Fr.) Govaerts, J. P. (Free U. Brussels Brugmann Hosp., Belgium). *Acta Gastroenterol. Belg.* 33(7):482-541, 1970.

1358 EFFECT OF PEPTIC ULCER SURGERY ON BASAL GASTRIC SECRETION AND ON GASTRIC SECRETION IN RESPONSE TO STIMULATION WITH HISTALOG. (Por.) De Paula Castro, L. (UFMG Sch. Med., Belo Horizonte, Brazil) and C. E. D. Nogueira. *Rev. Assoc. Med. Bras.* 16(6):205-210, 1970.

1359 HISTOLOGY OF THE GASTRIC MUCOSA AFTER VAGOTOMY AND DRAINAGE FOR DUODENAL ULCER. (E.) Bank, S. (Groote Schuur Hosp., Cape Town, South Africa), I. N. Marks and J. H. Louw. *S. Afr. Med. J.* 44(47):1354-1356, 1970.

1360 CORRELATION BETWEEN LOCALIZATION OF GASTRIC PEPTIC ULCERS AND HISTOLOGICAL STRUCTURE OF STOMACH MUCOUS MEMBRANE. (Pol.) Mastynska, M. (Med. Acad. 2nd Surg. Clin., Poznan Poland), B. Reslinski and G. Zengteler. *Pol. Przegl. Chir.* 42(4):330-334, 1970.

1361 MUCOPOLYSACCHARIDES OF GASTRIC JUICE FROM HEALTHY INDIVIDUALS AND PATIENTS WITH GASTRIC ULCER. (Pol.) Chocha, A. (Med. Acad. Inst. Biochem., Poznan, Poland) and J. Chmiel. *Diagn. Lab. (Warsz.)* 6(3):231-237, 1970.

1362 EFFECTS OF DIGESTIVE ENZYMES AND BILE SALTS ON THE DIGESTION AND ABSORPTION OF FATS IN GASTRECTOMIZED PATIENTS. (Por.) Rosenberg, D. (Univ. Sao Paulo Sch. Med., Brazil) N. Carvalho and E. R. Rosenberg. *Rev. Assoc. Med. Bras.* 16(7):231-240, 1970.

1363 CHANGES IN GALLBLADDER FUNCTION IN CASES OF GASTRODUODENAL ULCER. (Fr.) Delov, I. (I.P. Pavlov Inst. Postgrad. Med., Plovdiv, Bulgaria) and S. Temelkov. *Folia Med. (Plovdiv)* 12(1):70-74, 1970.

1364 MEDICOLEGAL IMPLICATIONS OF POST-TRAUMATIC GASTRODUODENAL ULCERS. (Rev. (Fr.) Mendez, J. (Acad. Paris), A. Hadengue and G. Terris. *Med. Leg. Dommage Corp.* 3(2):173-187 1970.

1365 EFFECTS OF CLIMATE AT THE DUSZNIK SPA ON PATIENTS WITH PEPTIC ULCERS. (Pol. Bojanowicz, K. (Med. Acad. 1st Intern. Dis. Clin., Lodz, Poland), Z. Rybarczyk and A. Zubows *Balneol. Pol.* 15(1-2):15-21, 1970.

See also numbers: 915, 920, 1011, 1015, 1195, 1217, 1273, 1301

1366 ACCIDENTAL TRANSECTION OF THE AMPULLA OF VATER AT SURGERY FOR DUODENAL ULCER. (E.) Clemmesen, T. (Bispebjerg Hosp., Copenhagen, Denmark) and H. Baden. *Acta Chir. Scand.* 136(6): 497-502, 1970.

Case reports are presented for 5 male patients, aged 19-56 yr, in whom the ampulla of Vater was accidentally transected during surgery for duodenal ulcer (4 cases) or duodenal cancer (1 case). In 4 cases the injury was detected during surgery and was successfully repaired. In the remaining case, the injury was not detected until 4 days later when duodenal leakage became clinically apparent; the pancreaticoduodenostomy was found to be leaking, and was successfully replaced by a pancreaticojejunostomy. Transection of the ampulla of Vater, a rare but serious surgical complication, can be detected by routinely compressing the gallbladder after freeing the duodenum and watching for extraduodenal oozing of bile. Papilloduodenostomy (4 cases) and a Roux-en-Y pancreaticojejunostomy (2 cases) are the reconstructive procedures of choice.

1367 ETIOLOGY AND TREATMENT OF SMALL INTESTINAL ATRESIA: ANALYSIS OF A SERIES OF 127 JEJUNOILEAL ATRESIAS AND COMPARISON WITH 62 DUODENAL ATRESIAS. (E.) Nixon, H. H. (Hosp. Sick Child., London) and R. Tawes. *Surgery* 69(1):41-51, 1971.

Late fetal accident to the bowel after its formation, incarceration, and reduction of physiological hernia during fetal life apparently are a common cause of jejunoileal atresia. This contrasts with duodenal atresias which probably arise earlier in development. There was also a low incidence of abnormalities outside the digestive tract in jejunoileal atresia compared with duodenal atresia. Elective resection of the proximal bowel has improved results compared to direct anastomosis. Treatment of atresias has been recently almost entirely by elective resection and end-to-back anastomosis. Treatment and risk groupings are given; high jejunal atresias are treated by resection back to the duodenal flexure with direct anastomosis, and terminal ileal atresias are treated so that the ileocecal valve is preserved. There was an improved prognosis with more distal atresia. The commonest primary cause of death was an anastomotic leak or dysfunction, indicating the need for alternative techniques eliminating blind pouches with stasis and ulceration. Results with duodenal atresias have improved with gastrostomy decompression and transanastomotic feeding. Associated anomalies and extremely low birth weight are the main problems in treatment.

368 APPLE PEEL SMALL BOWEL: AN UNCOMMON VARIANT OF DUODENAL AND JEJUNAL ATRESIA. (E.) Dickson, J. A. S. (Inst. Child Health, London). *J. Pediatr. Surg.* 5(6):595-600, 1970.

Babies with "apple peel" small bowel present with the symptoms and radiographic appearance of duodenal or high jejunal atresia. The appearance is unmistakable as the distal small bowel comes directly off an unfixed cecum and twists along an artery derived from the marginal artery of the colon. There may be evidence of healed peritonitis and, also, meconium in the distal segment of gut. Common anomalies not directly related to the main bowel abnormality observed include extrahepatic biliary atresia and a separate atresia of the transverse colon. Causes of death were prematurity and poor blood supply of the distal jejunum. Combination of Bishop-Koop anastomosis with gastrostomy and a feeding tube led into the distal jejunum was the recommended treatment. This anomaly appears to combine features of an error of growth (incidence of other anomalies and occurrence in siblings) with those of a vascular accident.

1369 INTESTINAL SECRETION AFTER INTRAVENOUS FLUID INFUSION IN SMALL BOWEL OBSTRUCTION. (E.) Sung, D. T. W. (Boston City Hosp., Mass.) and L. F. Williams, Jr. *Am. J. Surg.* 121(1):91-95, 1971.

In dogs, serial blood pressure, central venous pressure, and serum sodium and potassium were not changed by rapid infusion of 200-400 ml of isotonic saline. The hematocrit of normal dogs dropped significantly during infusion, while, in dogs with complete terminal ileal obstruction, the hematocrit increased significantly. Normal bowel showed an increase of secretion in response to i.v. infusion of fluid, but the extent was much less than that seen with obstructed bowel. For obstructed loops, secretion was stable during the control period, increased within the first 10 min of infusion, reach a maximum during the second 30 min of infusion, and decreased markedly within 1 hr after infusion was completed. All segments secreted a near-isotonic fluid as compared to plasma. The distal ileal juice, however, contained less sodium and more potassium. This changed ratio was more striking in the group with obstruction. These results suggest that rapid rehydration of a dehydrated patient with intestinal obstruction may cause much of the fluid to escape into the intestinal lumen. This sudden increase of fluid could cause kinking and convert incomplete to complete obstruction, or hasten development of strangulation.

1370 ULTRASTRUCTURAL CHANGES IN THE JEJUNAL MUCOSA AFTER ABDOMINAL TRAUMA IN THE DOG. (E.) Póka, L. (Univ. Med. Sch., Pecs, Hungary), J. Kerner and L. Lukács. *Acta Chir. Acad. Sci. Hung.* 11(3):213-224, 1970.

Changes in the jejunal mucosa of dogs with experimental abdominal injury (gastric transection restored by end-to-end anastomosis) included edematous mucous membranes with dilated vessels and thickened and deformed villi. Epithelial crypt cells lost their basophil staining and there were no granular Paneth's cells. The brush border was defective, the cell boundaries were indistinct, and the cytoplasm showed a poor structure. Electron microscope study revealed narrower absorption cells in certain areas. In the ectoplasm, the usual vesicles were often missing; the cisterns of the endoplasmic reticulum were distended and the degree of their granulation was frequently reduced. Many distended, vacuolar mitochondria were seen, although the crestate structure was blurred in some. Atrophy and marginal condensation with a widening of the gap between the 2 layers of the nuclear envelope were also observed. Among the dark immature cells in the crypts, some bright ones were observed at a more advanced stage of development with degeneration similar to that in absorption cells. There were less goblet cells than usual, but their structure was normal. Apparently, in adynamic ileus as well as obstructive ileus, one should recognize the possibility of cellular lesions of the intestinal epithelium. Considering the vast surface of the small intestinal mucosa, it may be involved in the pathogenesis of metabolic acidosis.

1371 EXPERIMENTAL LYMPHATIC OBSTRUCTION IN THE ILEUM. (E.) Kalima, T. V. (Univ. Cent. Hosp., Helsinki, Finland). *Ann. Chir. Gynaecol. Fenn.* 59(4):187-201, 1970.

Obstruction of the mesenteric lymphatics was performed in 60 rats (15 controls had laparotomies) to develop methods of lymphatic obstruction and for the application of methods of studying lymph vessels. Fifteen of the rats with lymphatic obstruction died within 3 postoperative days of paralytic ileus accompanied by purulent peritonitis or intestinal perforation. About 1/3 of the animals exhibited lymphatic reorganization of varying degrees. Following the obstruction, animals showed intra-abdominal adhesions, hyperplastic lymph nodes in the mesentery, and dilated lymphatic vessels with incompetent valves. An increased leakage of polyvinylpyrrolidone from the circulation into the gastrointestinal tract was observed. The intestinal lumen was enlarged, the walls were thickened and the lymphatics were dilated, expecially in the villi, submucosa and serosa. Lymphocytic aggregations and monocytes were often observed.

1372 EXTERNAL SMALL INTESTINAL FISTULA. (Rev.) (E.) Kollmar, G. H. *Am. J. Surg.* 120(5):620-622, 1970.

1373 PERFORATION OF DUODENAL DIVERTICULA: A NEW HYPOTHESIS. (E.) Reilly, P. L. (Roy. Melbourne Hosp., Australia) and G. A. Kune. *Aust. Nz J. Surg.* 40(1):40-42, 1970.

1374 PROFUSE HEMORRHAGE FROM MECKEL'S DIVERTICULUM. (Ger.) Fuchsjager, N. (Univ. 1st Surg. Clin., Vienna, Australia). *Acta Chir. Austria* 2(3):103-104, 1970.

1375 INTUSSUSCEPTION IN INFANCY AND CHILDHOO (E.) Dennison, W. M. (Roy. Hosp. Sick Child., Glasgow, Scotland) and M. Shaker. *Br. J. Surg.* 57(9):679-684, 1970.

1376 INTESTINAL OBSTRUCTION DUE TO ABNORMAL DUODENAL FIXATION IN INFANTS. (E.) Humphry, A. (Hosp. Sick Children, Toronto, Canada). *J. Can. Assoc. Radiol.* 21(4):251-256, 1970.

1377 DATA COLLECTED OVER A 20-YEAR PERIOD ON ATRESIA OF THE SMALL INTESTINE. (Sl.) Pohl, V. (Comenius U. Sch. Med., Bratislava, Czechoslovakia), M. Macek and M. Mor *Lek. Obzor* 19(8):431-437, 1970.

1378 DUODENAL PERFORATION BY A METALLIC FOR BODY. CASE REPORT. (Fr.) Vitani, C. and J. Vedrinne. *Med. Leg. Dommage Corp.* 3(2): 204-207, 1970.

1379 ILEAL RESECTION AND BILE SALT METABOLI (E.) Alpers, D. (Jewish Hosp., St. Louis, Mo.), S. Wessler and L. V. Avioli. *JAMA* 215(1):101-104, 1971.

1380 STENOSING ULCER OF THE SMALL INTESTINE AFTER INGESTION OF A SINGLE POTASSIUM CHLORIDE TABLET. (Fr.) Tostivint, R. (Rue Pastre, Dreux, France), H. Rozenberg and L. Chauveinc. *Chirurgie* 96(4):316-318, 1970.

1381 RARE ILEOCECAL LESIONS. (E.) Calenof L. (Passavant Mem. Hosp., Chicago, Ill *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):343-351, 1970.

1382 COEXISTENCE OF PHEOCHROMOCYTOMA AND CARCINOID SYNDROME PRODUCED BY METASTATIC CARCINOID OF THE ILEUM. (E.) Warner, R. R. P. (City U. Mt. Sinai Sch. Med., New York, N. Y.) and A. S. Blaustein. *Mt. Sinai J. Med. NY* 37(4):536-548, 1970.

1383 CANCER OF THE SMALL INTESTINE. (Rus.) Yakushin, V. I. and V. I. Matveev. *Vestn. Khir.* 105(7):33-39, 1970.

1384 CARCINOMA OF THE THIRD PART OF THE DUODENUM. (E.) Cleator, I. G. M. (Leith Hosp., England). *Br. J. Surg.* 57(12): 934-937, 1970.

1385 CASE OF DUODENAL RETICULOSARCOMA. (Bul.) Kalev, N. and K. Agopyan. *Onkologiia (Sofiia)* 7(2):92-93, 1970.

1386 SELECTIVE SUPERIOR MESENTERIC ARTERIOGRAPHY IN RETICULUM CELL SARCOMA OF THE SMALL BOWEL. (E.) Lunderquist, A. (Cent. Hosp., Kalmar, Sweden), A. Lunderquist, K. H. Holmdahl and F. Clemens. *Radiology* 98(1):113-115, 1971.

1387 HISTOLOGY, ULTRASTRUCTURE, AND CYTOCHEMISTRY OF MALIGNANT, BIOLOGICALLY-ACTIVE ARGENTAFFINOMA OF THE ILEUM. (Cz.) Rossmann, P. (Inst. Circulat. Dis., Prague, Czechoslovakia), D. Urbanova and J. Fabian. *Cas. Lek. Cesk.* 109(46-47):1073-1078, 1970.

1388 LYMPHOSARCOMA OF THE SMALL INTESTINE. (It.) Papa, B. (Maggiore Hosp., Lodi, Italy) and G. Ciccone. *Rass. Int. Clin. Ter.* 50(15):962-970, 1970.

1389 MASSIVE MELENA DUE TO JEJUNAL HEMANGIOMA. (Jap.) Hasunuma, T. (Tokyo Kokuho Rengokai Fussa Hosp.), E. Shin and I. Kimizuka. *Toho Igakkai Zasshi (J. Med. Soc. Toho Univ.)* 17(2):263-265, 1970.

1390 GANGLIOCYTIC PARAGANGLIOMAS OF THE DUODENUM. A REPORT OF TWO CASES WITH LIGHT AND ELECTRON MICROSCOPIC EXAMINATION. (E.) Kepes, J. J. (Kansas U. Med. Ctr., Kansas City) and D. L. Zacharias. *Cancer* 27(1):61-70, 1971.

1391 BENIGN DUODENAL TUMORS: UNUSUAL SURGICAL PROBLEMS. (E.) Lawrence, W. Jr. (Med. Coll. Virginia, Richmond), D. D. McNeill, Jr., A. Cohen and J. J. Terz. *Ann. Surg.* 172(6):1015-1022, 1970.

See also numbers: 1221, 1222, 1223, 1224, 1675

MALABSORPTION

1392 STUDIES ON BILE SALT DECONJUGATION IN PATIENTS WITH TROPICAL SPRUE. (E.) Kapadia, C. R. (Christian Med. Coll. Hosp., Vellore, India), A. N. Radhakrishnan, V. I. Mathan and S. J. Baker. *Scand. J. Gastroenterol.* 6(1): 29-31, 1971.

In aspirates of small intestine contents from 20 patients with tropical sprue, no evidence was found of deconjugation of bile salts in jejunal samples and only 1 patient had evidence of some bile salt deconjugation in the ileum; this exception is not considered significant. Study of a single patient with malabsorption secondary to postgastrectomy-induced afferent loop syndrome showed marked deconjugation and dehydroxylation at all levels in the intestine. It is concluded that the deconjugation of bile salts is not a pertinent process in the development of steatorrhea of tropical sprue.

1393 COLLAGENOUS SPRUE - AN UNRECOGNIZED TYPE OF MALABSORPTION. (E.) Weinstein, W. M., D. R. Saunders, G. N. Tytgat and C. E. Rubin (U. Washington Sch. Med., Seattle). *N. Engl. J. Med.* 283(24):1297-1301, 1970.

A 51-yr-old woman presented with a proximal intestinal lesion indistinguishable from the flat lesion of celiac sprue, but diarrhea and steatorrhea persisted on a gluten-free diet. Large amounts of esosinophilic hyaline material were found in the lamina propria, especially subjacent to the surface epithelium. This eosinophilic material was histochemically identified as collagen. Corticosteroid therapy consistently ameliorated the massive diarrhea, but was associated with many complications (poor wound healing, psychotic episodes, gastric ulcer). Marked thinning of the mucosa was evident at autopsy, and relatively normal villous architecture was present only sparsely. Collagenous sprue, a unique, distinctive lesion of the intestinal mucosa associated with progressive malabsorption, only became apparent after repeated biopsies and sampling of the full length of the small intestine; this procedure is suggested when one is confronted with a case of intestinal atrophy which does not respond to a gluten-free diet.

1394 CHRONIC ULCERATIVE JEJUNITIS. REPORT OF A CASE AND DISCUSSION OF CLASSIFICATION. (E.) Moritz, M., J. M. Moran and

J. F. Patterson (Tufts-New England Med. Ctr., Boston, Mass.). *Gastroenterology* 60(1):96-102, 1971.

A 58-yr-old man exhibited a clinical picture of abdominal pain, diarrhea, weight loss, iron deficiency anemia, and malabsorption (documented by xylose test, stool fat, and Schilling test), with nonspecific ulceration and stricture of the jejunum. On 2 occasions, surgical resection of jejunal stricture resulted in clinical remission. The combination of malabsorption and nonspecific ulceration of the small intestine suggested that he might have had celiac sprue with intestinal ulceration or chronic ulcerative jejunoileitis. The above patient has survived 7 yr with treatment consisting of a gluten-free diet and 2 surgical resections of involved jejunum.

1395 A CASE OF SMALL-INTESTINAL MUCOSAL ATROPHY. (E.) Barry, R. E. (Bristol Roy. Infirm., England), J. S. Morris and A. E. A. Read. *Gut* 11(9):743-747, 1970.

A patient with a severe malabsorption syndrome which failed to respond to a gluten-free diet is described. Histological features of subepithelial fibrosis (well-defined bands of collagen) and apparently normal enterocytes were not suggestive of celiac disease, although subtotal villous atrophy was present in the jejunal mucosa. The findings of decreased mucosal thickness, of a normal mitotic rate in the crypt cell population, and of the decreased rate of loss of epithelial cells further suggested that the process producing the flat mucosa was not that of celiac disease. The condition was complicated by ileal ulceration and active tuberculosis. This patient apparently had a generalized wasting disease of obscure etiology, antedating and out of proportion to the tuberculous adenitis, which produced true atrophy of the small intestinal mucosa and severe malabsorption syndrome.

1396 INTESTINAL DIPEPTIDASES AND DISACCHARIDASES IN CHILDREN WITH MALABSORPTION. (E.) Dahlqvist, A. (Malmo Gen. Hosp., Sweden), T. Lindberg, G. Meeuwisse and M. Åkerman. *Acta Pediatr. Scand.* 59(6):621-630, 1970.

Subjects consisted of 13 children with celiac disease (improved on a gluten-free diet and exacerbated when on a gluten-containing diet) and 5 with "suspected cow's milk intolerance" who showed little or no clinical improvement on a gluten-free diet, but who improved when cow's milk was deleted from the diet. Before dietary adjustment, xylose absorption was decreased in 9 of the celiac group and in 4 of the cow's milk intolerance group, while fecal fat excretion was increased in 8 of 11 of the celiac group and in 4 of 5 in the latter group. Small intestinal biopsy showed flat mucosa of the celiac pattern in all 13 children with celiac disease and in all 3 of the other group, in whom biopsy was performed. In the celiac children, levels of disaccharidases and dipeptidases were low before treatment and increased afterwards. This stands in contrast to celiac disease in adults in whom the rise in disaccharidase on therapy was much slower; in fact, mean lactoase activity in adults failed to improve. After 4-29 months on a gluten-free diet, all children with celiac disease had gained weight, showed improved xylose absorption, and 7 of 8 showed normal fecal fat excretion. More or less marked improvement was seen in mucosal patterns. After 5-19 months of therapy, all children with milk intolerance showed a weight gain with disappearance of steatorrhea, while only 2 showed normal xylose absorption. Mucosal patterns tended to normalize during therapy. Disaccharidase and dipeptidase activities were low, and increased during therapy

1397 FURTHER STUDIES ON MULTIPLE FORMS OF PEPTIDASES IN MAMMALIAN TISSUES INCLUDING INTESTINAL MUCOSA FROM CHILDREN WITH TREATED AND UNTREATED COELIAC DISEASE. (E.) Dolly, J. O. (Univ. Coll. Dept. Biochem., Cardiff, Wales), A. Dillon, M. J. Duffy and P. F. Fottrell. *Clin. Chim. Acta* 31(1):55-62, 1971.

Intestinal dipeptidases and tripeptidases, in conjunction with other hydrolases, can be resolved into multiple molecular forms with broad substrate specificities. For example, at least 23 peptides were hydrolyzed by 2 or more peptidase bands on zymograms of human intestinal mucosa. In addition to humans, multiple forms of intestinal dipeptidases were present in 5 other species including ruminants. The number and electrophoretic mobilities of dipeptidases were identical in various rat tissues. Interestingly, some peptidase bands active against leucine-glycine and leucine-β-naphthyamide were apparently bound to the brush border nuclear fraction of the cell. Significantly, there was a great similarity of dipeptidase zymograms prepared from control subjects and from patients with celiac disease treated with gluten-free diets. Reductions in the levels of intestinal dipeptidases detected in untreated celiac patients are almost certainly due to secondary phenomena attributable to the abnormal morphology of the mucosa.

1398 SPLENIC FUNCTION IN ADULT COELIAC DISEASE. (E.) Marsh, G. W. (North Middlesex Hosp., London) and J. S. Stewart. *Br. J. Haematol.* 19(4):445-457, 1970.

In 5 of 18 patients with adult celiac disease, the peripheral blood film showed stigmata suggestive of splenic atrophy: Howell-Jolly bodies, Pappenheimer bodies, target cells, spherocytes, and postsplenectomy vacuoles. In these 5 patients, the half-time of clearance of

^{51}Cr-labeled heat damaged cells from the circulation was 50 min or more, and the scintillation scan revealed either no evidence of functioning splenic tissue or only mimimal localization of radioactivity suggesting marked hyposplenism. Nine patients had a somewhat prolonged clearance time (9-44 min); the scan, however, showing an apparently normal spleen. Two patients had clearance rates faster than those found in controls; both of these patients had enlarged spleens. In one this was associated with hepatic cirrhosis and in the other it was associated with unexplained neutropenia. Some degree of hyposplenism, with or without evidence of frank atrophy, may be a relatively frequent occurrence in patients with adult celiac disease.

1399 THE SMALL INTESTINAL MUCOSA IN DERMATITIS HERPETIFORMIS. I. SEVERITY AND DISTRIBUTION OF THE SMALL INTESTINAL LESION AND ASSOCIATED MALABSORPTION. (E.) Brow, J. R., F. Parker, W. M. Weinstein and C. E. Rubin (U. Washington Sch. Med., Seattle). *Gastroenterology* 60(3):355-356, 1971.

Fifteen patients had flat lesions near the duodenojejunal junction indistinguishable from those seen in celiac sprue. The lesions in 6 patients ranged in severity from almost normal to completely flat; the distribution of the lesions was patchy. Only 1 patient had normal intestinal biopsies. In the patients with predominantly flat lesions, the intestinal mucosal abnormality was more severe in the proximal than the distal small intestine, that is, similar in distribution to that seen in untreated celiac sprue. The considerable length of remaining normal small intestine in most of the patients with dermatitis herpetiformis probably accounts for the scarcity of symptoms and laboratory abnormalities. The pathogenesis of the intestinal lesion, as well as the relationship between the skin and gut lesions, remain unclear.

1400 THE SMALL INTESTINAL MUCOSA IN DERMATITIS HERPETIFORMIS. II. RELATIONSHIP OF THE SMALL INTESTINAL LESION TO GLUTEN. (E.) Weinstein, W. M., J. R. Brow, F. Parker and C. E. Rubin (U. Washington Sch. Med., Seattle). *Gastroenterology* 60(3):362-369, 1971.

Studies were performed on 6 patients with dermatitis herpetiformis to determine if a dietary relation exists between intestinal malformation and the skin disease. Prior to institution of the gluten free diet, all patients had diffuse, flat proximal intestinal lesions. Villous architecture improved in all patients on the gluten-free diet. The improvement was most striking beyond the duodenojejunal junction, but also was evident at the junction. Fecal fat excretion diminished in the 3 patients with definite steatorrhea. Apparently, these 6 patients had celiac sprue. Subsequent investigations may show that all dermatitis herpetiformis patients have celiac sprue; or perhaps the diagnosis of dermatitis herpetiformis will not be made unless a proximal intestinal lesion is present.

1401 DERMATITIS HERPETIFORMIS AND CELIAC SPRUE. (E.) Trier, J. S. (Boston U. Sch. Med., Mass.). *Gastroenterology* 60(3): 468-469, 1971.

1402 COMPARATIVE BIOPSY STUDIES ON THE MORPHOLOGY OF SMALL BOWEL MUCOSAL CHANGES IN NONTROPICAL SPRUE. I. LOUPE MICROSCOPE, HISTOLOGIC, MORPHOMETRIC, AND CELL KINETIC FINDINGS. (Ger.) Riecken, E. O. (Univ. Med. Clin., Marburg, Germany). *Klin. Wochenschr.* 48(20):1216-1225, 1970.

1403 RADIOISOTOPE STUDIES AND INTESTINAL BIOPSY IN CELIAC DISEASE. (Sp.) Osorio, A. (Maciel Hosp., Montevideo, Uruguay), M. Burghi De Cid and L. Peri. *Arch. Pediatr. Urug.* 41(2):115-119, 1970.

1404 NEW INVESTIGATIVE TECHNIQUES IN CHRONIC GASTROINTESTINAL DISEASES OF CHILDREN. (Fr.) Loeb, H. (Free U. Brussels Serv. Lab. Pediatr., Belgium), R. Parmentier and M. Dierickx. *Acta Paediatr. Belg.* 24(3-4):195-209, 1970.

1405 CHARACTERISTICS OF THE SMALL INTESTINE IN AN INFANT WITH PROTEIN AND CALORIC DEFICIENCY. (Sp.) Cedrato, A. E., L. Taubenslag and R. Ibarra. *Minerva Pediatr.* 22(26):1297, 1970.

1406 DISCUSSIONS ON MALABSORPTION SYNDROME. (Rev.) (Por.) Huggins, D. (Fed. U. Sect. Gastrenterol., Pernambuco, Brazil). *Folha Med.* 60(4):393-398, 1970.

1407 SEEKING THE CAUSES OF MALABSORPTION. (Rev.) (E.) Editorial. *N. Engl. J. Med.* 283(24):1340-1341, 1970.

1408 BONE DISEASE IN INTESTINAL MALABSORPTION. (Rev.) (E.) Muldowney, F. P. (Univ. Coll. Dept. Med., Dublin, Ireland), J. Donohoe and C. Ryan. *Mod. Treat.* 7(3):686-702, 1970.

1409 MALABSORPTION SYNDROME CAUSED BY MEPHENYTOIN; REPORT OF A CASE. (Sp.) Mendoza, H. R. (Dr. Robert Reid Cabral Child. Hosp., Santo Domingo, Dominican Republic). *Rev. Esp. Pediatr.* 26(153):299-304, 1970.

1410 LACTOSE INTOLERANCE IN SURINAM. (Dut.) Luyken, R. (TNO Cent. Inst. Nutr. Res., Zeist, Netherlands), F. W. M. Luyken Koning, M. J. T. Immikhuizen. *Voeding* 31(11):574-580, 1970.

1411 ADULT LACTASE DEFICIENCY: GENETIC CONTROL OR ADAPTIVE RESPONSE? (E.) Rosensweig, N. S. (St. Luke's Hosp. Ctr., New York, N. Y.). *Gastroenterology* 60(3):464-467, 1971.

1412 A CASE OF WHIPPLE'S DISEASE. (Fr.) Gastard, J., J. Loussouarn and P. O. Cousin. *Ouest Med.* 23(21):1797-1800, 1970.

1413 PATHOLOGY OF WHIPPLE'S DISEASE. CASE REPORT WITH ORGAN LIPID FINDINGS. (Ger.) Schmid, K. O. (U. Innsbruck Pathol. Inst., Austria) P. Spath, D. Eberhagen and M. Ciresa. *Z. Klin. Chem. Klin. Biochem.* 8(5):507-515, 1970.

1414 LIGHT AND ELECTRON MICROSCOPIC STUDY OF THE INTESTINAL MUCOSA IN WHIPPLE'S DISEASE. (Fr.) Delage, C. (Hotel Dieu, Quebec, Canada) and J. Morin. *Union Med. Canada* 99(8): 1405-1412, 1970.

See also numbers: 951, 1197, 1659, 1660, 1661, 1680, 1684, 1784

1415 BACTERIA AND AETIOLOGY OF CANCER OF LARGE BOWEL. (E.) Hill, M. J. (St. Mary's Hosp. Med. Sch., London), B. S. Drasar, V. Aries, J. S. Crowther, G. Hawksworth and R. E. O. Williams. *Lancet* 1(7690):95-100, 1971.

Geographical differences in the incidence of colon carcinoma may be related to dietary habits which, in turn, influence the nature and number of the intestinal bacteria. People living in areas with a high recorded incidence of carcinoma of the colon (U.S. and Great Britain) tend to live on diets containing large amounts of fat and animal protein, as opposed to those who live in areas where the diet is mainly vegetarian (Japan and South India). The latter group has fecal flora consisting of relatively larger numbers of streptococci and enterobacteria, and somewhat smaller numbers of bacteroides than the former group. Fecal steroids are increased and more extensively degraded by dehydroxylation in people from the high-risk areas. Deoxycholic acid, produced by bacterial degradation of bile salts may be a carcinogen. Also, bacteria might modify the steroid nucleus of the bile salts to produce recognizable polycyclic aromatic hydrocarbon carcinogens.

1416 RECURRENT COLORECTAL CARCINOMA: DETECTION, TREATMENT, AND OTHER CONSIDERATIONS. (E.) Polk, H. C., Jr. (Ellis Fischel State Cancer Hosp., Columbia, Mo.) and J. S. Spratt, Jr. *Surgery* 69(1):9-23, 1971.

Recurrences of colorectal carcinoma had been detected by the end of the second postresection year in 65% of the patients subjected to resection; hence, early and many follow-up examinations are suggested. Patients with infiltrating tumor margins, regional lymph node metastases, absence of inflammatory response about the primary carcinoma, and limited excision of regional lymph node-bearing tissue had a greater chance of developing recurrent neoplasm. The initial symptoms of recurrent colorectal carcinomas were so nonspecific that they contributed to delayed diagnosis in many patients. However, some patterns were sufficiently repetitive to warrant incorporation into a follow-up system. A palpable mass, often nodular, was the only sign uniformly indicative of recurrent carcinoma. The lesions were found in the perineal scar after combined abdominoperineal resection, in and about intestinal suture lines, in the abdominal incision, the liver, the rectal stump, and superficial lymph nodes. Of the various methods of examination, the thoracic roentgenogram proved most helpful, emphasizing the seldom appreciated frequency of pulmonary metastases from large intestine cancer. Survival with untreated recurrent carcinoma following detection is 5 months. With detection of limited recurrence and when resection intended for cure can be accomplished, selected individuals have a much better prognosis, quantitatively and qualitatively, than other patients.

1417 COLLAGENASE ACTIVITY IN THE GASTROINTESTINAL TRACT. (E.) Hawley, P. R. (Univ. Coll. Hosp. Med. Sch., London), W. P. Faulk, T. K. Hunt and J. E. Dunphy. *Br. J. Surg.* 57(12):896-900, 1970.

Three days following partial colonic resection and anastomosis in rabbits, the mean bursting wall pressure and colonic collagen (hydroxyproline content) decreased significantly, while colonic collagenase activity increased. At 7 days, all values were similar to control values. Following colonic anastomosis, there was increased collagenase production not only locally, but throughout the gastrointestinal tract, suggesting that wound healing is not only under local control. However, the increased amount of collagenase produced by the colon following injury compared with other parts of the gastrointestinal tract may be a significant factor in the incidence of colonic anastomotic breakdown.

1418 A CIRCULATORY COLLAGENASE INHIBITOR. (E.) Hawley, P. R. (Univ. Coll. Hosp. Med. Sch., London) and W. P. Faulk. *Br. J. Surg.* 57(12):900-904, 1970.

Colonic bursting wall tension, collagen content of the colon, or collagenase activity in explants from the colon were unchanged following the injection of cortisone acetate into rabbits. Addition of rabbit serum significantly inhibited the collagen-collagenase reaction of tissue explants. The inhibiting fraction was an α-globulin of high molecular weight. Adult and fetal sera from humans, rabbits, guinea pigs, and cows all contained an α-globulin inhibitor of collagenase. Circulating collagenase inhibitor was decreased following colonic anastomosis; this effect is apparently related to previously demonstrated decreased colonic collagen and increased colonic collagenase subsequent to colonic injury. The circulating collagenase inhibitor may be a genetically-linked protein, and of considerable importance in diseases such as rheumatoid arthritis and ulcerative colitis.

1419 ONE LAYER OR TWO LAYER COLONIC ANASTOMOSES? (E.) McAdams, A. J. (Western Pennsylvania Hosp., Pittsburgh), A. G. Meikle and J. O. Taylor. *Am. J. Surg.* 120(4):546-550, 1970.

In 115 dogs, standard double-layer inversion colonic anastomosis was compared to the Gambee single-layer inversion technique, which uses a silk inverting through-and-through suture with the knot on the mucosa posteriorly, and a silk inverting Gambee stitch with the knot on the serosa anteriorly. The Gambee single-layer anastomosis was less time-consuming, led to a quicker restoration of mucosal continuity and muscular realignment, and produced less stenosis than the standard double-layer anastomosis. Resistance to disruption after double-layer repair was greater on the 4th postoperative day, but was lower thereafter than with the single-layer Gambee repair. The inflammatory reaction was more pronounced and adhesion formation was less frequent after standard repair. The mortality was not significantly lower after the standard anastomosis than after the Gambee anastomosis. Local complications were less frequent after the standard repair than after the Gambee repair.

1420 THE NOTOCHORD AS AN ABNORMAL ORGANIZER IN PRODUCTION OF CONGENITAL INTESTINAL DEFECT. (E.) Elliott, G. B. (U. British Columbia, Vancouver, Canada), S. J. Tredwell and K. A. Elliott. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 10(3):628-634, 1970.

Among 58 consecutive patients with congenital defects of the hind gut (including extrophy of the cloaca, rectovesical fistula, rectovaginal fistula, and anal agenesis), associated lumbosacral vertebral anomalies were observed in 16% with anal ageneses and 42% with rectal ageneses. The vertebral deficiencies were of the type known to result from abnormal development of the notochord in the cervical region. The relative variations may represent geographic variations in incidence, or may be due to a tendency to ignore minor sacral changes which are sometimes difficult to see in the newborn. It was not possible to examine the precise state of the notochord in the sacrum in any of the patients. Complete agenesis of the sacrum was associated with true extrophy of the cloaca in 1 patient.

1421 MANOMETRIC AND CINERADIOGRAPHIC STUDIES ON ANORECTAL MOTILITY IN HIRSCHSPRUNG'S DISEASE BEFORE AND AFTER SURGICAL OPERATION. (E.) Suzuki, H. (Tohoku U. Sch. Med., Sendai, Japan), K. Watanabe and M. Kasai. *Tohoku J. Exp. Med.* 102(1):69-80, 1970.

Manometric and cineradiographic observations of 15 children (aged 16 days to 7 yr, 8 months) with Hirschsprung's disease and 18 children (aged 6 months-12 yr) who had undergone radical surgery as infants for the treatment of the disease gave evidence of the lack of propulsive movement in the aganglionic portion of the colon. Included in the study were measurement of resting intraluminal pressures of the anorectum, study of spontaneous motility, and response of the internal anal sphincter to distension. Absence of the normal internal anal sphincteric reflex caused the chronic and severe constipation seen in Hirschsprung's disease. Patients treated by rectal myotomy with colectomy or Lynn's rectal myectomy showed recovery of propulsive movement of the anorectal and ordinary anal sphincteric reflex. Swenson's rectosigmoidectomy was ineffective in restoring the internal anal sphincteric reflex.

1422 INCIDENCE OF DIABETES IN FAMILIES OF PATIENTS WITH HIRSCHSPRUNG'S DISEASE. (E.) Bugaighis, A. G. (Child. Hosp., Sheffield, England) and J. Lister. *J. Pediatr. Surg.* 5(6): 620-621, 1970.

A possible increased incidence of diabetes in the families of children with Hirschsprung's disease is reported. The severity of the disease also seems to be increased. More than half of the patients with a family history of diabetes required immediate surgical treatment at birth, and most required a colostomy in the first 6 months of life; in patients with no family history, less than 1/3 required immediate surgery Also, in diabetic families, about half the patients had aganglionic segments extending higher than the sigmoid colon, and in the nondiabetic families, only 14 of 48 patients had such an extensive lesion. There was a higher death rate in those patients with Hirschsprung's disease who had a family history of diabetes.

1423 INVASIVE CARCINOIDS OF THE COLON. (E.) Shulman, H. (Cornell U. Med. Coll., New York, N. Y.) and P. Giustra. *Radiology* 98(1):139-143, 1971.

1424 CARCINOID TUMORS OF THE RECTUM. (E.) Ponka, J. L. (Henry Ford Hosp., Detroit Mich.) and L. Walke. *Dis. Colon Rectum* 14(1): 46-56, 1971.

1425 CARCINOMA METASTATIC TO THE VERMIFORM APPENDIX: REPORT OF THREE CASES. (E.) Dieter, R. A., Jr. (Loyola Med. Sch., Maywood, Ill.). *Dis. Colon Rectum* 13(4):336-340, 1970.

1426 TWO CASES OF PRIMARY CARCINOMA OF THE APPENDIX. (It.) Caddia, C. (Ghilarza Hosp., Italy). *Rass. Med. Sarda* 73(3):184-189, 1970.

1427 MULTIPLE CANCERS OF THE LARGE BOWEL. (E.) Alford, J. E. (Buffalo Gen. Hosp. N. Y.) and D. F. Falsetti. *Dis. Colon Rectum* 13(4):316-329, 1970.

1428 CARBOHYDRATE RICH COMPOUNDS IN THE COLONIC MUCOSA OF MAN. I. HISTOCHEMIC CHARACTERISTICS OF NORMAL AND ADENOMATOUS COLONIC MUCOSA. (E.) Makela, V. (U. Helsinki 2nd Dept.

Pathol., Finland), L. K. Korhonen and G. Lilius. *Cancer* 27(1):120-127, 1971.

1429 CARBOHYDRATE RICH COMPOUNDS IN THE COLONIC MUCOSA OF MAN. II. HISTOCHEMICAL CHARACTERISTICS OF COLONIC ADENOCARCINOMAS. (E.) Korhonen, L. K. (U. Turku Dept. Anat., Finland), V. Makela and G. Lilius. *Cancer* 27(1):128-133, 1971.

1430 NEUROFIBROMATOSIS OF THE COLON: A UNIQUE MANIFESTATION OF VON RECKLINGHAUSEN'S DISEASE. (E.) Raszkowski, H. J. (St. Francis Hosp., Lynwood, Calif.) and R. F. Hufner. *Cancer* 27(1):134-142, 1971.

1431 CARCINOMA OF THE COLON. (Fr.) Chevrel, B. (St. Antoine Hosp., Paris) and J. P. Chevrel. *Presse Med.* 78(39):1719-1722, 1970.

1432 ISCHEMIC COLITIS PROXIMAL TO OBSTRUCTING CARCINOMA OF THE COLON: REPORT OF A CASE. (E.) Ganchrow, M. I. (Ferguson Clin., Grand Rapids, Mich), J. F. Clark and H. G. Benjamin. *Dis. Colon Rectum* 14(1):38-42, 1971.

1433 CARCINOMA OF THE COLON IN THE YOUNG ADULT. (E.) Brown, R. L. (Louisiana State U. Sch. Med., Shreveport), H. I. May and E. K. Lang. *J. La. State Med. Soc.* 122(9): 282-283, 1970.

1434 STAGING OF COLONIC AND RECTAL CARCINOMAS: A REVIEW OF TEN YEARS' EXPERIENCE AT A PRIVATE HOSPITAL. (E.) Smith, D. L. (Queen Angels Hosp., Los Angeles, Calif.), C. E. Signorino, T. O. De La Cruz and M. I. Lewis. *Dis. Colon Rectum* 13(4):302-307, 1970.

1435 COLORECTAL CANCER. ROLE OF THE CLINIC IN EARLY DIAGNOSIS. (Sp.) Meeroff, M. (Buenos Aires, Argentina) and J. C. Meeroff. *Galicia Clin.* 42(8):596-606, 1970.

1436 INTRALYMPHATIC RADIOTHERAPY IN PERINEAL RECURRENCE OF CANCER OF THE RECTUM. (Rev.) (Sp.) Grandval, C. M. and H. Garcia Del Rio. *Prensa Med. Argent.* 57(13):629-632, 1970.

1437 VILLOUS TUMOUR OF THE RECTUM. (Rus.) Sementrov, P. M. *Arkh. Patol.* 32(7): 78, 1970.

1438 UNUSUAL SMOOTH MUSCLE TUMOR OF THE RECTUM. (E.) Prinn, M. G. (London Hosp.). *Proc. R. Soc. Med.* 63(9):965-966, 1970.

1439 PRESENT THERAPEUTIC POSSIBILITIES: CARCINOMA OF THE RECTUM. (Fr.) Chevrel, B. (St. Antoine Hosp., Paris) and J. P. Chevrel. *Presse Med.* 78(45):1987-1990, 1970.

1440 THE PLACE OF CECOSTOMY IN THE RELIEF OF OBSTRUCTIVE CARCINOMA OF THE COLON. (E.) Balslev, I. (Municipal Hosp., Copenhagen, Denmark), H. E. Jensen and J. Nielsen. *Dis. Colon Rectum* 13(3):207-210, 1970.

1441 THE CARE OF A COLOSTOMY. (E.) Hawley, P. R. (St. Mark's Hosp., London). *Practitioner* 206(1231):114-120, 1971.

1442 POSTERIOR AND ANTERIOR ANAL PROCTOTOMY: A SIMPLIFIED TECHNIC FOR POSTOPERATIVE ANAL STENOSIS. (E.) Shropshear, G. (Provident Hosp., Chicago, Ill.). *Dis. Colon Rectum* 14(1):62-66, 1971.

1443 UNUSUAL CASE OF PILONIDAL SINUS. (E.) Lord, P. H. (Wycombe Gen. Hosp., High Wycombe, England). *Proc. R. Soc. Med.* 63(9): 967-968, 1970.

1444 AN OPEN, SEMIPRIMARY CLOSURE OPERATION FOR PILONIDAL SINUSES, USING LOCAL ANESTHESIA. (E.) Abramson, D. J. (Walter Reed Army Med. Ctr., Washington, D. C.). *Dis. Colon Rectum* 13(3):215-219, 1970.

1445 DIVERTICULAR DISEASE OF THE COLON. (Heb.) Theodor, E. *Harefuah* 79(4): 186-187, 1970.

1446 ACUTE ABDOMEN DUE TO SIGMOID DIVERTICULITIS. (Rev.) (Sp.) Miyar Gonzalez, A. *Rev. Esp. Enferm. Apar. Dig.* 31(6):601-606, 1970.

1447 COLONIC RESECTIONS WITH PRIMARY ANASTOMOSIS FOR INTESTINAL OBSTRUCTION. (Sp.) Vinuales, R. M. *Prensa Med. Argent.* 57(13):599-603, 1970.

1448 CHANGING CONCEPTS OF DIVERTICULAR DISEASE OF THE COLON. (E.) Jacobs, E. (San Francisco, Calif.). *Dis. Colon Rectum* 14(1):29-31, 1971.

1449 IMPERFORATE ANUS AND HEREDITY. (E.) Winkler, J. M. (St. Joseph Mercy Hosp., Ann Arbor, Mich.) and E. D. Weinstein. *J. Pediat R. Surg.* 5(5):555-558, 1970.

1450 EXCEPTIONAL CASE OF DOUBLE APPENDICULAR STUMP. (It.) Valente, P. (U. Naples Inst. Gen. Clin. Surg., Italy). *Rif. Med.* 84(34):925-927, 1970.

1451 CASE OF COLOCOLONIC INVAGINATION CAUSED BY EPIPLOIC APPENDICES. (It.) Trapani, P. (U. Turin Inst. Radiol., Italy) and G. M. Gasparri. *Minerva Radiol.* 15(5-6):133-136, 1970.

1452 X-RAY DIAGNOSIS OF ENDOMETRIOSIS OF THE RECTUM AND LARGE INTESTINE. (Rus.) Shniger, N. U. *Akush. Ginekol. (Mosk.)* (8): 16-18, 1970.

1453 PROCTOLOGIC DISORDERS AND HEMATOLOGIC DISEASES. (E.) Prager, D. (Allentown Hosp., Pa.), I. T. Khubchandani, H. D. Trimpi and P. V. Martin. *Dis. Colon Rectum* 14(1):4-11, 1971.

1454 TRAUMATIC PROCTITIS. (E.) Kirkman, N. F. (Withington Hosp., Manchester, England). *Proc. R. Soc. Med.* 63(9):968, 1970.

1455 MEASUREMENT OF GAMMA-RAY DOSAGE IN THE RECTUM OF PATIENTS WITH CERVICAL CANCER TREATED WITH VARIOUS TYPES OF RADIUM APPLICATORS. (Pol.) Nozdryn-Plotnicki, B. (Inst. Oncol., Warsaw, Poland) and K. Lukawska. *Nowotwory* 20(2):107-113, 1970.

See also numbers: 1226, 1296, 1675, 1676, 1677, 1678, 1685

ULCERATIVE COLITIS

1456 ANTIBACTERIAL ANTIBODIES IN RECTAL AND COLONIC MUCOSA IN ULCERATIVE COLITIS. (E.) Monteiro, E. (Cent. Middlesex Hosp., London), J. Fossey, M. Shiner, B. S. Drasar and A. C. Allison. *Lancet* 1(7693):249-251, 1971.

When antibodies were present in the colorectal mucosa, they reacted only with some fecal anaerobes, whereas serum antibodies reacted only with aerobes. Apparently, mucosal antibody is produced by plasma cells and lymphocytes in the mucosa in response to local antigenic stimulation, even though most of the antibodies belong to the IgG, and not the usually predominant IgA, class. The mucosa of patients with ulcerative colitis usually contains antibodies against certain anaerobes from the patient's own feces, or from those of other colitis patients. The presence of IgG antibodies capable of reacting with antigens of bacteria in the patient's own fecal flora indicates that immunopathological reactions play a part in the perpetuation of ulcerative colitis.

1457 IMMUNOLOGIC COMPETENCE IN IDIOPATHIC ULCERATIVE COLITIS. (HUMORAL ASPECTS OF IMMUNITY.). (E.) LoGrippo, G. A. (Henry Ford Hosp., Detroit, Mich.), K. Anselm, H. Hayashi and R. J. Priest. *Henry Ford Hosp. Med. J.* 18(4):249-256, 1970.

When serum immunoglobulins (IgA, IgG, and IgM) were measured in 86 patients with idiopathic ulcerative colitis, it was determined that 44% had normal immunoglobulins, 51% had immunoglobulin excesses, and 5% had immunoglobulin deficiencies. There was no consistent pattern which might suggest a deficient immune system, either on an individual basis or in the variant categories. Relatively few of the colitis patients showed excessive reaction to a variety of common bacterial and viral pathogens usually found in the gastrointestinal tract. Higher bacterial counts were found in those with more severe forms of the disease; this group tended also to have excessive immunoglobulin levels.

1458 IMMUNOLOGICAL STUDIES IN ULCERATIVE COLITIS. V. FAMILY STUDIES. (E.) Lagercrantz, R., P. Perlmann (Wenner-Gren Inst., Stockholm, Sweden) and S. Hammarström. *Gastroenterology* 60(3):381-389, 1971.

Sera from first degree relatives of patients with ulcerative colitis were analyzed for the presence of antibodies to colon, colon-related antigen from Escherchia coli 0:14, an unrelated antigen from E. coli 0:75. The incidence of elevated antibody titers to colon antigen in all female relatives (especially sisters and daughter was higher than in female controls. No significa difference was found between male relatives and male controls. Female relatives also had a higher incidence of elevated titers to E. coli 0:14 (shown previously to cross-react with colon antigen of ulcerative colitis); males, again, showed no change. No difference in titer distribution was found when the various groups were tested against E. coli 0:75 (colon unrelated antigen). Although anticolon antibodies in relatives may arise as a result of some bowel inflammation, findings of clinical health in these relatives contradict the notion that they develop secondarily to tissue destruction occurring in ulcerative colitis. A genetic predisposition, as well as environmental factors such as cross-reactive bacterial antigens, may lead to autoimmunity in ulcerative colitis.

1459 CLINICOPATHOLOGICAL STUDY OF CHRONIC ULCERATIVE COLITIS. LIGHT AND ELECTRON MICROSCOPIC FINDINGS. (Jap.) Takatsuki, M. (Toho U. Sch. Med., Tokyo). *Toho Igakkai Zasshi (J. Med. Soc. Toho Univ.)* 17(2):213-234, 1970.

1460 A COMPARISON BETWEEN CLINICAL STATE, MACROSCOPIC, AND MICROSCOPIC APPEARANCES OF RECTAL MUCOSA, AND CYTOLOGIC PICTURE OF MUCOSAL EXUDATE IN ULCERATIVE COLITIS. (E.) Binder, V. (Gentofte Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 5(7):627-632, 1970.

1461 PATHOLOGICAL ANATOMY OF NONSPECIFIC ULCERATIVE COLITIS IN CHILDREN. (Rus.) Kogoi, T. F., I. I. Iudin and O. A. Kanshina. *Pediatriia* 8:64-72, 1970.

1462 AN ASSOCIATION OF THYROID DISEASE, ULCERATIVE COLITIS, AND DIABETES MELLITUS. REPORT OF THREE CASES IN YOUNG WOMEN. (E.) Clubb, J. S. (Prince Henry Hosp., Sydney, Australia), P. J. Black and D. C. Wallace. *Australas. Ann. Med.* 19(2):159-164, 1970.

See also number: 1647

PANCREAS

1463 DIAGNOSIS AND TREATMENT OF PANCREATIC INSUFFICIENCY. (Hun.) Szarvas, F. O. (Med. Univ., Szeged, Hungary). *Orv. Hetil.* 112(8):423-427, 1971.

1464 CASE OF CELLULAR STEATONECROSIS AND CARCINOMA OF THE PANCREAS. (Fr.) Terrasse, J. (BCHR Med. Clin., Clermont-Ferrand, France), S. Moinade and B. B. De La Guillaumie. *Ann. Med. Interne* 121(11):935-940, 1970.

1465 ASSOCIATED AUTONOMIC DYSFUNCTION AND CARCINOMA OF THE PANCREAS. (E.) Thomas, J. P. (U. Liverpool Dept. Surg., England) and R. Shields. *Br. Med. J.* 4(5726):32, 1970.

1466 DOPAMINE IN A HUMAN ISLET CELL CARCINOMA METASTASIS. (E.) Cegrell, (U. Lund Dept. Histol., Sweden). *Acta Pathol. Microbiol. Scand.* [*A*] 78(6):734, 1970.

1467 RADIATION THERAPY IN CANCER OF THE PANCREAS. (Rev.) (Rus.) Beletskii, V. I., V. A. Mikhailichenko and V. P. Baikova. *Vopr. Onkol.* 16(8):84-85, 1970.

See also numbers: 1049, 1056, 1668, 1673

PANCREATITIS

1468 CHANGES IN PROELASTASE IN PANCREATIC TISSUE AND PANCREATIC JUICE IN RATS WITH ETHIONINE-INDUCED PANCREATITIS. (Ger.) Schoenemann, J. (Univ. Med. Clin., Rostock, Germany). *Z. Gesamte Inn. Med.* 25(24):1120-1123, 1970.

In male and female Wistar rats, a single injection of ethionine (1 mg/g i.p.) significantly increased total pancreatic proelastase activity after 24 hr and slightly reduced it after 48 hr. No proelastase activity was found in the pancreatic juice 48 hr after administration of ethionine. In rats with chronic ethionine intoxication (0.5 mg/g/day i.p. for 5 consecutive days), total pancreatic proelastase activity was slightly reduced, and the proelastase activity of pancreatic juice was significantly decreased. Ethionine reduced the proelastase concentration in pancreatic juice from all animals after stimulation with secretin or pancreozymin. Traces of active elastase found in pancreatic tissue and pancreatic juice from some animals are attributed to the methods used. These results show that ethionine has the same effect on pancreatic proelastase and pancreatic proelastase secretion as it has on amylase, lipase, and trypsinogen. They suggest that ethionine pancreatitis results from an initial permeability block followed by an increase in permeability.

1469 INOTROPIC INFLUENCE OF ENDOGENOUS PEPTIDES IN EXPERIMENTAL HEMORRHAGIC PANCREATITIS. (E.) Lefer, A. M. (U. Virginia Sch. Med., Charlottesville), T. M. Glenn, T. J. O'Neill, W. L. Lovett, W. T. Geissinger and S. L. Wangensteen. *Surgery* 69(2):220-228, 1971.

A decline in myocardial performance (significan lower cardiac output at a comparable cardiac-filling pressure) and hemoconcentration occurre in dogs with hemorrhagic pancreatitis induced b injection of a solution of trypsin and bile sal into the major pancreatic duct. Plasma concent tions of myocardial depressant factor (MDF), an exogenous peptide, gradually increased, reachin maximum levels within 4 hr after induction of the pancreatitis. A parallel increase occurred in serum amylase activity. A marked reduction in myocardial performance occurred 8 hr after induction of pancreatitis, although the arteria blood pressure remained stable. Bradykinin was also found in the plasma during pancreatitis an may have partially masked the cardiodepressant effect of MDF, perhaps by competing with MDF fo the same receptor sites and by exerting a posit inotropic effect. This may contribute to the stable blood pressures observed during the firs 8 hr of the experiment. Dogs eventually developed circulatory collapse which was fatal 12-14 hr after induction of pancreatitis. Simp i.v. injection of bile salts and trypsin did no produce pancreatitis or MDF.

1470 PAPILLARY INTEGRITY AS A FACTOR IN PANCREATIC REFLUX. (E.) Rosato, E. (U. Pennsylvania Sch. Med., Philadelphia), J. C Oram-Smith, H. A. Reber, B. Czernobilsky and F. E. Rosato. *Am. J. Surg.* 121(1):13-15, 1971.

The role of elevated duodenal pressure, and the resultant ischemic damage to the pancreatic duct sphincters, in the production of pancreatitis was studied in 10 dogs with Pfeffer loop preparations. Pressures of 125-150 cm H_2O, maintained for 75 to 275 min were required to produce duodenal reflux in 4 of the dogs; no reflux was observed in the other 6. All animals with reflux had parenchymal hemorrhage in the pancreatic duct papilla in histologic sections. Papillary venous congestion was evident in all 10 dogs. Structural damage to the papilla from prolonged pressure may be necessary for the occurrence of duodenal reflux.

1471 CHRONIC RELAPSING PANCREATITIS IN CHILDHOOD. A REPORT OF 3 CASES. (E.) Vernon, J. K. (St. George's Hosp., London), F. Stening and R. Smith. *Br. J. Surg.* 57(12): 906-908, 1970.

Chronic relapsing pancreatitis, an unusual disease in childhood, should be considered in any case of recurrent abdominal pain for which the cause is not evident. The clinical picture presented by these patients is very similar to that seen in adults: intermittent epigastric pain, with nausea, vomiting, and weight loss, and long symptomless periods. Surgery is the preferred treatment for these patients; the operative procedure depends on both the experience of the operator and the extent of pancreatic destruction.

1472 IMPORTANCE OF SOME ENZYMES IN ACUTE PANCREATITIS. (Bul.) Kovacheva, N. and J. Popivanov. *Savr. Med.* 21(4):12-17, 1970.

1473 NUTRITIONAL ALTERATION OF PANCREATIC ACINAR CELL STABILITY. (E.) Haig, T. H. B. (U. Saskatchewan Dept. Surg., Saskatoon, Canada). *Ann. Surg.* 172(5):852-860, 1970.

1474 THE RENAL COMPONENT IN ACUTE PANCREATITIS. (Rum.) Ionescu, G. (1st Surg. Clin., Cluj, Rumania) and V. Casian. *Clujul Med.* 43(2):427-436, 1970.

1475 ELECTROLYTE BALANCE IN ACUTE HEMORRHAGIC NECROTIC PANCREATITIS. (Rum.) Ionescu, G. (1st Surg. Clin., Cluj, Rumania) and A. V. Stancu. *Clujul Med.* 43(2):437-439, 1970.

1476 ETIOLOGICAL, CLINICAL, AND BIOLOGICAL ASPECTS OF ACUTE PANCREATITIS IN OBESE SUBJECTS. (Rum.) Gligore, V. (2nd Med. Clin., Cluj, Rumania), A. Dutu and I. Fatila. *Clujul Med.* 43(2):311-319, 1970.

1477 CLINICAL AND THERAPEUTIC ASPECTS IN ACUTE PANCREATITIS. (Rum.) Banicesu, M., M. Teodoriu and H. Niculescu. *Clujul Med.* 43(2):415-419, 1970.

1478 PANCREATITIS: RECENT VIEWS ON ETIOLOGY, DIAGNOSIS, AND TREATMENT. (Rev.) (Sw.) Lundh, G. O. (Gen. Hosp. Archangels, Stockholm, Sweden). *Nord. Med.* 84(43):1353-1359, 1970.

1479 CLINICAL AND ANATOMICAL COMPARISONS IN 57 CASES OF ACUTE PANCREATITIS. (Rum.) Iacomi, G. (United Hosp., Piatra-Neamt, Rumania), I. Costescu and G. Vintea. *Clujul Med.* 43(2): 335-344, 1970.

1480 RECTAL BLEEDING AS THE PRESENTING SYMPTOM OF ACUTE PANCREATITIS. (E.) Sahebjami, H. (Washington Hosp. Ctr., Washington, D. C.), L. Gillespie, P. J. Ferris and S. H. Danovitch. *Am. J. Gastroenterol.* 54(4):388-394, 1970.

1481 PANCREATITIS AS A RARE COMPLICATION AFTER LUMBAR AORTOGRAPHY. (Ger.) Martinek, H. (Univ. 1st Surg. Clin., Vienna, Austria) and F. Piza. *Acta Chir. Austria* 2(3):105-106, 1970.

1482 FOLLOW-UP SURGERY AFTER ACUTE PANCREATITIS. (Rum.) Caloghera, C. (Surg. Clin. IIA, Timisoara, Rumania) and G. Crisan. *Clujul Med.* 43(2):393-398, 1970.

See also numbers: 1049, 1057, 1058, 1198, 1626

1483 CHARACTERIZATION OF THE ACUTE HEPATIC FAILURE SYNDROME ASSOCIATED WITH THE ANHEPATIC STATE.

(E.) Mori, K. (New York Hosp.-Cornell Med. Ctr., N. Y.), R. Quinlan, D. Richter, R. Kaster, B. H. Tan and H. Gans. *Surg. Gynecol. Obstet.* 131(5):919-927, 1970.

The terminal stage of hepatic failure following total hepatectomy in the dog and rhesus monkey was characterized by the classical shock syndrome. Cardiovascular changes included a progressive decline in blood pressure and bradycardia which became pronounced in the later stages. Shock levels (systolic pressure below 95 mm Hg) were not reached, on the average, until 12 hr after liver resection. As a result of bradycardia and decreased stroke volume, cardiac output values fell rapidly; these changes occurred early and preceded blood pressure changes. With the onset of shock, blood pH values, urinary excretion, and serum sodium levels declined, while serum potassium and bilirubin levels rose. Total serum protein, serum albumin, fibrinogen, plasminogen, and euglobulin clot lysis time all were decreased. Treatment with fresh blood, tetracycline, methylprednisolone (50-200 mg i.v.), isoproterenol, mannitol, or atropine (0.05-0.15 mg/kg i.v.) failed to alter the postoperative course significantly. The survival time of animals who had undergone prior splenectomy was significantly shorter. It is probable that during the anhepatic state in man (e.g. during human liver transplantation), changes occur which are similar to those found in these animals.

1484 A NEW CONCEPT FOR HEPATIC LOBECTOMY. EXPERIMENTAL STUDIES AND CLINICAL APPLICATION.

(E.) Fortner, J. G. (Mem. Hosp., New York, N. Y.), M. H. Shiu, W. S. Howland, J. P. Gaston, A. Kunlin, N. Kawano, T. Hattori and E. J. Beattie, Jr. *Arch. Surg.* 102(4):312-315, 1971.

Studies on dogs provided a sound basis for accepting the concept of preliminary isolation of the liver from the circulation before partial hepatectomy. During this period, the liver can be preserved by perfusion with a chilled dextran solution. The present method was sufficient for 1 hr; longer ischemic periods have been tolerated in human liver homografts with the use of the same perfusate. The initial clinical attempt ended in a fatality due to a technical error (bleeding from the inferior phrenic veins during isolation). The magnitude of bleeding was not appreciated since blood was diluted with the perfusate as it ran out. A 2nd patient's postoperative course was uneventful except for hypokalemia and bleeding due to heparin effects in the immediate postoperative period. With this procedure, the mortality for hepatic lobectomy may be reduced, and the cure rate subsequently increased.

1485 NEUROPSYCHIATRIC AND ELECTROENCEPHALOGRAPHIC CHANGES AFTER TRANSPLANTATION OF THE LIVER.

(E.) Parkes, J. D. (King's College Hosp., London), I. M. Murray-Lyon and R. Williams. *Q. J. Med.* 39(156):515-527, 1970.

Two patients with primary hepatomas had no preoperative neuropsychiatric abnormalities; another one with subacute hepatic necrosis had acute encephalopathy; and the 4th patient had cirrhosis with severe chronic portal systemic encephalopathy Following orthotopic hepatic transplantation, the patient in acute coma regained full consciousness, and paroxysmal, triphasic electroencephalographic activity was abolished. In the patient with chronic encephalopathy, there was rapid improvement in his mental state. Postoperative episodes of rejection occurred in all patients, and these were accompanied by minor mental changes and some electroencephalographic deterioration. Changes in the pattern of uptake of technetium sulfur colloid by the liver and spleen suggest a return of the hepatic blood flow to normal following transplantation, with a decrease in collateral circulation.

1486 LIVER CANCER DIFFERENTIALS IN IMMIGRANT AND LOCAL-BORN CHINESE IN SINGAPORE.

(E.) Shanmugaratnam, K. (U. Singapore Fac. Med.) and C. Y. Tye. *J. Chronic Dis.* 23(5/6):443-448, 1970.

Of 99 Chinese liver cancer patients (79 males and 20 females), interviewed in Singapore between March 1966 and August 1968, 72 had been born in China, 18 in Singapore, and 9 in Malaysia. Comparison with a group of 1044 Chinese hospital controls showed that the risk of liver cancer was significantly higher among Chinese immigrants to Singapore than among Singapore-born Chinese. However, the liver cancer risk among native Chinese was much lower than that found in previou studies. No relationship was found between liver cancer and province of birth in China, duration of residence in Singapore, or dialect group. It is possible that the lower relative risk of liver cancer among native Chinese found in this study may be due, at least in part, to a real increase in the incidence of liver cancer among Singapore Chinese, perhaps because of changes in some environmental factors.

1487 PORTAL HYPERTENSION COMPLICATING HEPATIC SARCOIDOSIS.

(E.) Rosenberg, J. C. (Wayne State U. Sch. Med., Detroit, Mich.). *Surgery* 69(2):294-299, 1971.

An analysis was made of 17 patients with portal hypertension due to hepatic sarcoidosis collecte from the literature and an additional experience with this syndrome. Hepatic involvement was not the sole expression of sarcoidosis for any of the patients; 11 had lymph node and 5 had pulmonary involvement. Mild liver dysfunction (rarely severe) was found in all patients. An interesting and uncommon consequence of hepatic sarcoidosis was a biliary or cholangiolitic form of cirrhosis. Ascites, due apparently to hepatic vein compression, was present in only 4 of 18 patients. Hepatomegaly and splenomegaly were found in almost all of the patients documented. Hypersplenism was present in 9 patients and was a prominent feature of patients whose disease was complicated by portal hypertension. The mean portal pressure was 352 cm H_2O. Esophageal varices were present in 14 of 18 patients, 8 of whom had bleeding from the varices. Four patients with bleeding varices underwent portosystemic shunts and did well after surgery.

1488 NONSHUNT OPERATIONS IN PORTAL HYPERTENSION WITHOUT CIRRHOSIS. Hassab, M. A. (Alexandria, Egypt). *Surg. Gynecol. Obstet.* 131(4):648-654, 1970.

An analysis is made of 232 patients, 65% of whom had schistosomal hepatic fibrosis and portal hypertension, who underwent surgery for decongestion of gastric and esophageal varices. The operation consisted of splenectomy and ligation of the left gastric arteries. Of the 140 patients who bled before surgery, 10 (7%) had recurrent bleeding after surgery, 7 (5%) died postoperatively, and 2 underwent a second corrective operation. Minor bleeding (less than 50 ml) occurred in 7 other patients, but it did not require therapy. Of the 92 patients in which surgery was performed prophylactically, none had extensive bleeding and only 6 reported minor bleeding that did not require therapy. Only 7 of the 232 patients developed transient jaundice, 2 had jaundice before death, 10 had ascites, and 7 had edema of the lower extremities. Both ascites and edema resulted from malnutrition and responded to diet therapy. During a follow-up period of 1-12.5 yr, 44 (18%) of these patients died. Only 7 patients (3%) died of bleeding and remainder died of hepatic failure or unrelated causes.

1489 A CLINICAL EVALUATION OF SERUM MONOAMINE OXIDASE, WITH SPECIAL REFERENCE TO HEPATIC FIBROSIS. (E.) Ito, K. (Kyoto U. 2nd Med. Clin., Japan), J. Nakagawa, C. Minakuchi and M. Fukase. *Digestion* 4(1):49-58, 1971.

Serum monoamine oxidase levels were increased in patients with cirrhosis and in those with chronic hepatitis or liver cancer associated with moderate or advanced fibrosis. Enzyme levels increased gradually with progression of hepatic fibrosis. In 5 selected patients with liver cirrhosis treated with β-mercaptoethylamine, serum monoamine oxidase levels decreased and the levels increased again after withdrawal of treatment. Moderately elevated levels of the enzyme were observed in 2 patients with acromegaly, a disease state in which biosynthesis of collagen is accelerated by overproduction of growth hormone. The determination of serum monoamine concentration is useful as a supplemental diagnostic procedure for organ fibrosis, especially for advanced hepatic fibrosis.

1490 CYTOCHEMICAL AND ULTRASTRUCTURAL CHANGES IN RAT LIVER IN EXPERIMENTAL PORPHYRIA. II. EFFECTS OF REPEATED INJECTIONS OF ALLYLISOPROPYLACETAMIDE. (E.) Biempica, L. (Albert Einstein Coll. Med., Bronx, N. Y.), N. S. Kosower and P. S. Roheim. *Lab. Invest.* 24(2): 110-117, 1971.

Sprague-Dawley rats received 2, 3, 4, or 8 s.c. injections of 400 mg/kg allylisopropylacetamide at intervals of 24-28 hr, and were sacrificed 18 hr after the last injection. In liver cells of animals receiving 2 injections, there was a marked increase in the number of lipid droplets and disorganization of the endoplasmic reticulum. With the 3rd and additional injections, the lipid deposition decreased and returned to normal; there was a continuing increase in smooth endoplasmic reticulum, and this was more evident in centrilobular cells than in periportal ones. At the time of lipid release by the liver cells, vacuoles were seen opening into the Disse's spaces. These vacuoles were thought to contain very low density lipoprotein particles. Some areas on membranes of these vacuoles had a coating similar to that of the coated vesicles of the Golgi apparatus and of the plasma membrane, suggesting transport of lipid from the Golgi apparatus to the circulation by way of the cytoplasm.

1491 BIOCHEMICAL DEFECTS IN TWO TYPES OF HUMAN HEPATIC PORPHYRIA. (E.) Kaufman, L. and H. S. Marver (U. Texas Southwestern Med. Sch., Dallas). *N. Engl. J. Med.* 283(18):954-958, 1970.

A 5-fold increase in aminolevulinic acid synthetase was observed in a patient with hereditary coproporphyria in association with a marked increase in urinary and fecal coproporphyrin and in the urinary excretion of aminolevulinic acid. In a patient with porphyria cutanea tarda, although the urinary excretion of uroporphyrin was 250 times normal, aminolevulinic acid synthetase, dehydrase, and ferrochelatase levels were normal. Hereditary coprophyria resembles acute intermittent porphyria and variegate porphyria in that it is genetically transmitted as an autosomal dominant disorder and it is hepatic, rather than erythropoietic, in nature. Three possible hypotheses describe the defective site of porphyrin biosynthesis in hepatic porphyria: a primary increase in aminolevulinic acid synthetase activity; partial blocks in heme biosynthesis; or diversion of heme from its role in the feedback regulation of aminolevulinic acid synthetase.

1492 BLOOD VOLUME AND BILIRUBIN PRODUCTION IN ACUTE INTERMITTENT PORPHYRIA. (E.) Bloomer, J. R. (NCI, Bethesda, Md.), P. D. Berk, H. L. Bonkowsky, J. A. Stein, N. I. Berlin and D. P. Tschudy. *N. Engl. J. Med.* 284(1):17-20, 1971.

In 13 patients with acute intermittent porphyria, both the mean total blood volume and total RBC volume were significantly decreased by about 20% of normal levels. Neither the clinical manifestation of porphyria nor levels of urinary porphobilinogen were correlated with the extent of reduction in blood volume. The half-life of ^{51}Cr-labeled RBC was within normal limits in 5, and minimally reduced in 2 patients. As measured in 6 patients, the rate of production of bilirubin was strongly correlated with the circulation RBC mass. It is concluded that acute intermittent porphyria is not accompanied by an increase in ineffective erythropoiesis or by a marked increase in hepatic bilirubin production. However 3 possibilities are suggested: 1) although increased hepatic heme is degraded to bilirubin, the increase may not be detectable by these studies; 2) the increased heme may be degraded by a nonbilirubin mechanism; and, 3) heme synthesis, and therefore bilirubin production, may not be increased in acute intermittent porphyria due to partial enzyme blockage of the heme biosynthetic pathway. Additional liver function defects in these patients are suggested by other clinical symptoms observed in these studies.

1493 CHRONIC HEPATIC PROPHYRIA IN CHRONIC AGGRESSIVE HEPATITIS. (E.) Doss, M. (Univ. Biochem. Hyg. Inst., Marburg a d. Lahn, Germany), D. Look and H. Henning. *Klin. Wochenschr.* 49(1):52-54, 1971.

A disorder of porphyrin synthesis in which no clinical symptoms were apparent, called chronic hepatic porphyria (CHP), is distinguished from latent porphyria cutanea tarda on the basis of biochemical symptoms. With CHP there is a lower total porphyrin excretion (0.18-0.64 mg/l) and an increased excretion of coproporphyrin (18-55%) in the urine. Chronic aggressive hepatitis, fatty liver, fibrosis, and cirrhosis were shown to produce an increase in the renal excretion of uroporphyrin, hepta-, hexa- and pentacarboxylic porphyrins, and coprophorphyrin. Two types of CHP are distinguished: type A with coproporphrin: uroporphyrin greater than 1 (in fibrosis) and type B in which coprophorphyrin:uroporphyrin is less than 1 (in chronic aggressive hepatitis). Hepatic concentrations of uroporphyrin and heptacarboxylic porphyrin are increased more in type B, and type A can develop into type B. An increase in the level of δ-aminolevulinic acid synthetase and reduced carboxylation of heptacarboxylic porphyrinogen are key factors in the biochemical pathogenesis.

1494 SYNDROME OF REVERSIBLE HEPATIC DYSFUNCTION ASSOCIATED WITH HYPERNEPHROMA: AN EXPERIMENTAL STUDY. (E.) Hanash, K. A. (U. Minnesota Mayo Grad. Sch. Med., Rochester), D. C. Utz, J. Ludwig, K. G. Wakim, R. E. Ellefson and P. P. Kelalis. *Invest. Urol.* 8(4):399-404, 1971.

Hypernephromas were removed from patients with and without hepatic dysfunction, and extracts were injected i.p. (in acetone and saline) into ICR/Ha mice in doses ranging from 0.5-2.0 ml daily for 1-4 weeks. Compared with controls, experimental mice showed no changes in livers, kidneys, spleen or thymus, or in liver function tests, nor was bilirubin detected in the urine. Biochemical and electrophoretic studies of tumor extracts and mouse sera failed to reveal any substance capable of producing the hepatic dysfunction observed in some of the patients. In 2 other patients with hypernephroma and hepatic dysfunction, not included in this series, serum lipoprotein electrophoresis showed an abnormal β-band.

1495 DUBIN-JOHNSON SYNDROME IN ISRAEL. I. CLINICAL, LABORATORY, AND GENETIC ASPECTS OF 101 CASES. (E.) Shani, M. (Tel-Aviv U. Sch. Med., Israel), U. Seligsohn, E. Gilon, C. Sheba and A. Adam. *Q. J. Med.* 39(156): 549-567, 1970.

Clinical and laboratory data were collected for 101 patients with Dubin-Johnson Syndrome diagnose in Israel between 1955 and 1969 to evaluate the diagnostic efficiency of various laboratory tests to estimate the prevalence of the disease in Israel, and to further clarify its mode of transmission. The most significant diagnostic laboratory tests for the disease, in addition to hyperbilirubinuria and liver histology, were the secondary rise in plasma concentration of injected BSP and the extremely low BSP transport rate. Females were more asymptomatic than males, and the age at onset of jaundice and the diagnosi of Dubin-Johnson syndrome in females tended to be delayed. In only 5 of 58 sibships was there an affected or reportedly affected parent. The rate of consanguinity among parents of affected sibships was 45%. Only 5 of 215 offspring of those with Dubin-Johnson syndrome had the disease The fully expressed syndrome is seemingly transmitted as an autosomal recessive disease, with heterozygotes exhibiting various subclinical findings.

1496 DUBIN-JOHNSON SYNDROME IN ISRAEL. II. ASSOCIATION WITH FACTOR-VII DEFICIENCY. (E.) Seligsohn, U. (Tel-Hashomer Gov Hosp., Israel), M. Shani, B. Ramot, A. Adam and C. Sheba. *Q. J. Med.* 39(156):569-584, 1970.

Sera from 78 Israeli patients with Dubin-Johnson Syndrome and 109 normal individuals was assayed for vitamin K-dependent clotting factors. A diminished prothrombin activity was observed in 60% of the patients, and 15 had mild bleeding activity. The mean level of factor VII among those with Dubin-Johnson syndrome was 51.9±25.5% as compared to 85.2±31.2% among controls. The patients also exhibited decreased levels of factor II, while levels of factors IX and X were normal. All 138 relatives of 56 of the patients had normal serum bilirubin and SGOT levels, but 14 exhibited severe factor VII deficiency, and 37 had partial factor VII deficiency. In a substantial number of kindreds of those with Dubin-Johnson syndrome, the disease and factor VII deficiency coexist, but may also be observed independently in different members.

1497 CAUSES OF MACROPLANIA OF ERYTHROCYTES IN DISEASES OF THE LIVER AND BILIARY TRACT WITH SPECIAL REFERENCE TO LEPTOCYTOSIS. (E.) Werre, J. M. (Municipal Hosp., Arnhem, Netherlands), P. W. Helleman, M. C. Verloop and J. de Gier. *Br. J. Haematol.* 19(2):223-235, 1970.

In 22 of 25 patients with hepatobiliary diseases and macroplania, the macroplania was associated with leptocytosis; target cells were present in only 2 patients. In these patients, there was a positive correlation between changes in mean cell diameter and serum bilirubin, the latter occurring first. A moderate negative correlation was established between mean cell diameter and osmotic fragility. There was a moderate positive correlation between mean cell diameter and cholesterol content per ml of erythrocytes, and a more pronounced positive correlation between the calculated amount of cholesterol per erythrocyte and the mean cell diameter. A positive correlation was also found between the calculated amount of cholesterol per erythrocyte and that per square μm of erythrocyte surface area. The osmotic fragility of normal erythrocytes introduced into the circulation of patients with leptocytosis became similar to the diminished osmotic fragility of the patient's own erythrocytes. The order in which the changes occur is probably as follows: changes in peripheral circulation lead to an increase in mean amount of cholesterol per erythrocyte and per unit of erythrocyte surface area; this leads to increase in mean erythrocyte surface area while mean cell volume remains normal, to an increase of mean cell diameter and diminution of mean cell thickness, and finally to decreased osmotic fragility.

1498 METABOLIC STUDIES IN LIVER GLYCOGEN DISEASE WITH SPECIAL REFERENCE TO LACTATE METABOLISM. (E.) Zuppinger, K. (U. Bern Pediatr. Clin., Switzerland) and E. Rossi. *Helv. Med. Acta* 35(5):406-422, 1970.

Lactate and pyruvate metabolisn associated with the derangement of energy consumption and metabolic acidosis in patients with liver glycogen storage disease was studied in 9 patients with type I, type III, or unclassifiable glycogenosis. The elevation of blood lactate, pyruvate, and the lactate/pyruvate ratio and metabolic acidosis in type I glycogenosis probably result from increased glycogenolysis and gluconeogenesis. Glucose and ethanol (0.7 g/kg p.o. or i.v.) decreased blood lactic and pyruvic acid by slowing down these 2 compensatory mechanisms. Lactate and pyruvate metabolism in type III glycogenosis was almost normal. The blood glucose level in type III depends mainly on gluconeogenesis, as indicated by the decreasing effect of ethanol on plasma glucose. Glucose administration increased blood lactate and pyruvate in these patients, thus aggravating the metabolic acidosis. There was no abnormality of pyruvate and lactate metabolism in unclassifiable glycogenotic patients.

1499 TISSUE COPPER, ZINC, AND MANGANESE LEVELS IN WILSON'S DISEASE: STUDIES WITH THE USE OF NEUTRON ACTIVATION ANALYSIS. (E.) Leu, M. L. (c/o Publications Editor, NAMRU-2, APO San Francisco, Calif.), G. T. Strickland and S. J. Yeh. *J. Lab. Clin. Med.* 77(3):438-444, 1971.

Determination of tissue Cu levels in 3 Chinese patients with Wilson's disease and in 2 Chinese controls suggests that penicillamine therapy reduces Cu levels most rapidly in the kidney, more slowly in the liver and other tissues, and slowest in the CNS. Mean Cu concentrations in the CNS of patients with Wilson's disease were 9-18 times higher than control values, and the liver Cu content was markedly increased in 1 patient who did not receive penicillamine therapy. Two patients who had been treated with penicillamine for 12-14 months had splenic Cu levels 2 times higher than the controls, but the untreated patient had levels 65 times higher. Renal Cu contents were normal in the penicillamine-treated patients. The untreated patient had markedly increased Cu levels in all other tissues studied, but only slight elevations were found in treated patients. Zn levels were higher in the CNS of patients with Wilson's disease than in the controls, and the untreated patient's hepatic and splenic Zn levels were higher than control values. Tissue Mn levels were normal in all 3 patients with Wilson's disease.

1500 SYMPTOMATIC ACCESSORY LOBE OF THE LIVER ASSOCIATED WITH ABSENCE OF THE LEFT LOBE. (E.) Llorente, J. and H. Dardik (1230 Gerard Ave., Bronx, N. Y.). *Arch. Surg.* 102(3):221-223, 1971.

1501 SINGLE NONPARASITIC CYST OF THE LIVER. (Rum.) Stancescu, M. (Fundeni Clin. Hosp., Bucharest, Rumania), G. Niculiu, S. Carnaru and S. Gogiulescu. *Chirurgia (Buc.)* 19(7):613-616, 1970.

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Hosp., Boston), J. E. Fischer and W. H. Hendren. *Arch. Surg.* 102(3):227-228, 1971.

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1505 RAPID CONTROL OF MASSIVE HEPATIC HEMORRHAGE BY LASER RADIATION. (E.) Gonzalez, R., R. F. Edlich and H. C. Bredemeier. *Surg. Gynecol. Obstet.* 131(2):198-200, 1970.

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HYPERPLASTIC LIVER NODULES IN RAT INDUCED BY 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE, 2-FLUORENYLACETAMIDE, AND DL-ETHIONINE. (E.) Yasuzumi, G. (Nara Med. U., Kashihara City, Japan), R. Sugihara and N. Ito. *Exp. Cell Res.* 63(1):83-95, 1970.

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1548 LIVER FUNCTION IN HEPATOSIS OF PREGNANCY AND PREECLAMPSIA. WITH SPECIAL REFERENCE TO MODIFIED BROMSULPHTHALEIN TESTS. (E.) Ylostalo, P. (U. Oulu Dept. Obstet. Gynecol., Finland). *Acta Obstet. Gynecol. Scand.* 49(Suppl. 4):1-53, 1970.

1549 RAISED SERUM ALKALINE PHOSPHATASE IN RHEUMATOID DISEASE. AN INDEX OF LIVER DYSFUNCTION? (E.) Kendall, M. J. (Queen Elizabeth Hosp., Birmingham, England), R. Cockel, J. Becker and C. F. Hawkins. *Ann. Rheumatol. Dis.* 29(5):537-540, 1970.

1550 GLUCOSE EFFECT ON TRYPTOPHAN OXYGENASE AND TYROSINE AMINOTRANSFERASE INDUCTION AFTER ALLYLISOPROPYLACETAMIDE-INDUCED PORPHYRIA IN THE RAT. (E.) Wetterberg, L. (VA Ctr., Los Angeles, Calif.), E. Geller and A. Yuwiler. *Biochem. Pharmacol.* 19(11):2833-2838, 1970.

1551 HEPATIC FIBROSIS IN CHILDREN. (Por.) Zlochevsky, M. J. (Santa Casa Misericordia Hosp., Sao Paulo, Brazil). *Pediatr. Prat. (S. Paulo)* 41(3-4):149-156, 1970.

1552 TRANSIENT HEPATIC DEPOSITION OF IRON IN PRIMARY HEMOCHROMATOSIS WITH IRON DEFICIENCY FOLLOWING VENESECTION. (E.) Pollycove, M. (U. California Donner Lab., Berkele R. A. Fawwaz and H. S. Winchell. *J. Nucl. Med.* 12(1):28-30, 1971.

1553 CRIGLER-NAJJAR SYNDROME IN FOUR OF FIVE SIBLINGS WITH POSTMORTEM FINDINGS IN ONE. (E.) Huang, P. W. H. (U. Saskatchewan Coll. Med., Saskatoon, Canada), B. Rozdilsky and J. W. Gerrard. *Arch. Pathol.* 90(6):536-542, 1970

1554 DUBIN-JOHNSON SYNDROME: A FAMILY STUDY. (E.) Banerje, A. K. (U. Malaya Dept. Med., Kuala Lumpur, Malaysia). *Med. J. Malaya* 25(1):21-24, 1970.

See also numbers: 1068, 1107, 1199, 1200, 1201, 1203, 1247, 1608, 1611, 1646, 1657, 1764

ACUTE NONVIRAL HEPATITIS AND HEPATIC INJURY

1555 THE EFFECTS OF ULTRASOUND OF VARYING FREQUENCIES ON RAT LIVER. (E.) Taylor, K. J. W. (Guy's Hosp. Med. Sch., London) and J. Pond. *J. Pathol.* 100(4):287-293, 1970.

Changes in normal liver due to variations in the frequency of ultrasound waves and prevention of excessive heating by delivering the energy in short pulses were studied in 3-month-old Wistar rats. Low frequencies (0.5, 1, and 2 megaHertz), which are used in diagnostic and therapeutic application, were more damaging than a high one (6 megaHertz). Damage was most extensive in areas around the central hepatic vein. Acid phosphatase activity was absent in damaged region of the liver; this pattern of cell damage was also demonstrated by hematoxylin and eosin staining techniques.

1556 PLASMA-PARACETAMOL HALF-LIFE AND HEPATIC NECROSIS IN PATIENTS WITH PARACETAMOL OVERDOSAGE. (E.) Prescott, L. F. (Roy. Infirm., Edinburgh, Scotland), P. Roscoe, N. Wright and S. S. Brown. *Lancet* 1(7698):519-522, 1971.

Clinical and biochemical evidence of severe liver damage was found in more than half of the patients admitted to a poison treatment center; one developed fatal hepatic coma. Most patients (16 of 18) with plasma paracetamol concentrations of more than 50 μg/ml at 12 hr developed hepatic necrosis. The mean half-life of unchanged paracetamol was more than double that in patients with hepatic necrosis than in those without; a half-life greater than 4 hr was associated with hepatic necrosis. Plasma paracetamol half-lives were generally more reliable guides to prognosis than plasma paracetamol concentrations. The mean conjugated paracetamol concentration was higher in patients without liver damage. No therapy, including pyrilamine and hydrocortisone, has proven effective in reducing or preventing hepatic necrosis after overdosage of paracetamol.

1557 THE EFFECT OF ALPHA-NAPHTHYL ISOTHIOCYANATE ON THE LIVER OF SHEEP AND CALVES. (E.) Gopinath, C. (U. Liverpool Dept. Vet. Clin. Studies, England) and E. J. H. Ford. *J. Pathol.* 100(4):269-280, 1970.

Ruminants were used in a study of the development of liver lesions and the subsequent changes in liver function. Sheep received α-naphthyl isothiocyanate in single p.o. doses of 50, 100, 400, or 600 mg/kg or 14 consecutive daily p.o. doses of 100 mg/kg; calves received a single dose of 400 or 600 mg/kg. After a single dose, the livers of calves and sheep showed swelling, vacuolization, and loss of particulate staining of the periportal cells. There were also decreases in glutamate dehydrogenase, succinic tetrazolium reductase, and nonspecific esterase activities in the liver, as well as increased activity of alkaline phosphatase in the centrilobular area of the liver, and diffuse activity of ATPase around the canaliculi. Arginase and sorbitol and glutamate dehydrogenases were also released into the serum. BSP clearance was reduced and increased serum levels of bilirubin were seen. When small doses were administered, there was also a decrease in the albumin:globulin ratio and erythrolysis. At any dosage, there was only slight evidence of increased portal fibrosis or bile duct hyperplasia.

1558 POTENTIATION OF CARBON TETRACHLORIDE HEPATOTOXICITY BY ETHANOL AND COLD. (E.) Wei, E. (U. California Sch. Public Health, Berkeley), L. C. K. Wong and C. H. Hine. *Toxicol. Appl. Pharmacol.* 18(2):329-334, 1971.

One group of Sprague-Dawley rats received gastric instillation of a 50% solution of ethanol, while another group was maintained at 2-4C or 31-33C for 18 hr. Eighteen hr after administration of ethanol or exposure to cold or warm temperatures, rats received a s.c. injection of 0.25 ml/kg of a 25% solution of carbon tetrachloride (CCl_4). Some rats were thyroidectomized or hypophysectomized 7-8 days before the study, while others received an i.p. injection of 5 ml/kg pentolinium bitartrate 30 min before the ethanol. Both ethanol and cold-exposure potentiated the SGPT response to CCl_4, but not the response in terms of liver triglyceride accumulation. Ethanol-induced potentiation of the SGPT response to CCl_4 was blocked by pentolinium bitartrate and warmth-exposure, but not by thyroidectomy; results after hypophysectomy were equivocal because of the increased mortality in hypophysectomized rats given ethanol. It is concluded that the increased hepatic response to CCl_4 in ethanol-treated rats is due to ethanol-induced release of norepinephrine.

1559 THE ROLE OF LIVER CELL ENDOPLASMIC RETICULUM AND MICROSOMAL ENZYMES IN CARBON TETRACHLORIDE TOXICITY: AN IN VIVO STUDY. (E.) Nayak, N. C. (All-India Inst. Med. Sci., New Delhi), P. Chopra and V. Ramalingaswami. *Life Sci.* [*I*] 9(24):1431-1439, 1970.

The role of liver cell endoplasmic reticulum and its enzyme systems in carbon tetrachloride (CCl_4) liver injury was studied in male albino rats. One hr after CCl_4 administration, there was a loss of glucose-6-phosphatase and of pyroninophilia in the centrilobular area, and this area widened during successive periods. Necrosis in the central part of the liver lobule was histologically confirmed 18-24 hr after treatment. Pretreatment with phenobarbital evoked a marked proliferation of smooth endoplasmic reticulum, and CCl_4 damage was more severe and involved wider areas of parenchyma in this group than in controls. The hepatotoxic effect of phenobarbital was blocked by either a protein-free diet administered for 2 weeks or by starvation. No protection against CCl_4-induced liver damage was seen after administration of β-diethylaminoethyl diphenylpropylacetate (Proadifen). CCl_4 is seemingly converted to its biologically active metabolite somewhere at the initial stages of the hepatic microsomal electron transport system, and neither cytochrome P-450 nor drug metabolizing enzymes per se seem to be directly involved in this activation.

1560 COLLAGEN BIOSYNTHESIS IN CIRRHOTIC RAT LIVER SLICES. A REGULATORY MECHANISM. (E.) Rojkind, M. (IPN Ctr. Res. Adv. Studies, Mexico City, Mexico) and L. Diaz De León. *Biochim. Biophys. Acta* 217(2):512-522, 1970.

In vitro preparations of liver slices from rats with carbon tetrachloride-induced cirrhosis showed increased biosynthesis of collagen along with increased amounts of collagen. Hepatic levels of collagen in these rats varied directly with the hepatic concentration of free proline, and varied inversely with the concentration of free glutamic acid. These changes were also found during the period of recovery from cirrhosis. Livers with increased pools of free proline manifested an increased ability to convert glutamate to proline.

1561 BIOCHEMICAL MECHANISMS OF LIVER INJURY. (Rev.) (E.) Judah, J. D. (Univ. Coll. Hosp. Med. Sch., London), A. E. M. McLean and E. K. McLean. *Am. J. Med.* 49(5):609-616, 1970.

1562 DRUG-INDUCED JAUNDICE. (Fr.) Lunel, J. (Ville-Evrard Hosp., Neuilly-sur-Marne, France). *Ann. Gastroentol. Hepatol. (Paris)* 6(5):379-389, 1970.

1563 OXYPHENISATIN AND JAUNDICE. (E.) Reynolds, T. B. and A. G. Redeker. *JAMA* 213(13):2273, 1970.

1564 EXPERIMENTAL STUDIES ON THE MECHANISM OF ETHIONAMIDE-INDUCED FATTY LIVER FORMATION (REPORT III). FATTY ACID COMPOSITION OF ETHIONAMIDE-INDUCED FATTY LIVER AND EPIDIDYMAL ADIPOSE TISSUE, AND SERUM FREE FATTY ACIDS IN ETHIONAMIDE-TREATED RATS. (Jap.) Inouye, B. (Kinki Cent. Hosp., Kaizuka City, Japan) and T. Wachi. *Kekkaku (Tuberculosis (Tokyo))* 45(7):207-211, 1970.

1565 ULTRASTRUCTURE OF LIVER CELLS IN WOMEN DURING TREATMENT WITH ORAL CONTRACEPTIVES, DURING NORMAL PREGNANCY, AND IN PATIENTS WITH TROPHOBLASTIC TUMORS. (Sp.) Martinez Manautou, J. (Mexican Natl. Inst. Social Security Med. Ctr., Mexico City), R. Aznar Ramos, J. Bautista O'Farril and A. Gonzalez Anguio. *Arch. Invest. Med.* 1(1):25-44, 1970.

1566 ACUTE ALCOHOLIC HEPATITIS. (Rev.) (Ger.) Schaffner, F. (Mt. Sinai Sch. Med., New York, N. Y.). *Therapiewoche* 20(40):2354-2357, 1970.

1567 PATHOLOGIC CHANGES IN CHRONIC ALCOHOLIC POISONING. (Ger.) Thaler, H. (Wilhelmine Hosp., Vienna, Austria). *Therapiewoch* 20(40):2347-2354, 1970.

1568 EXPERIMENTAL STUDY ON THE PROTECTIVE ACTION OF THIOCTIC ACID ON THE LIVER IN CHRONIC CARBON TETRACHLORIDE POISONING. (Pol.) Jaklinski, A. (Med. Acad. Inst. Forensic Med., Lublin, Poland), R. Bryc, A. Jaklinska and H. Dabski. *Pol. Tyg. Lek.* 25(42):1580-1581, 1970.

1569 HALOTHANE HEPATITIS AND ALLERGY. (Jap. Okumura, F. (Osaka U. Hosp., Japan). *Masui (Jap. J. Anesthesiol.)* 19(7):704-709, 1970.

1570 DIAGNOSIS OF AFLATOXIN POISONING ON THE BASIS OF LIVER HISTOLOGY. (Pol.) Czarnowski, A. (Inst. Vet. Hyg., Gdansk, Poland) and A. M. Zoltowska. *Med. Wet. (Lublin)* 26(9):522-524, 1970.

1571 RESULTS OF LIGHT AND ELECTRON MICROSCOP STUDIES OF THE LIVER PARENCHYMA OF RABBITS FOLLOWING SHORT, HIGH-DOSE ^{60}Co-IRRADIATION. (Ger.) Mollmann, H. (Wilhelms U. Anat. Inst., Munster (Westf.), Germany), J. Reisch, H. Alfes and F. Meyborg. *Strahlentherapie* 140(5):525-532, 1970.

1572 IRRADIATION OF THE LIVER IN CHILDREN: ACUTE EFFECTS ENHANCED BY CONCOMITANT CHEMOTHERAPEUTIC ADMINISTRATION? (E.) Tefft, M. (Child. Hosp. Med. Ctr., Boston, Mass.), A. Mitus and N. Jaffe. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 111(1):165-173, 1971.

See also number: 1093

ACUTE VIRAL HEPATITIS

1573 EPIDEMIOLOGY OF VIRAL HEPATITIS AS AN OCCUPATIONAL DISEASE. (Ger.) Geiler, W. (Carl Gustav Carus Med. Acad., Dresden, Germany), M. Quaas, E. Aris and E. Fröhlich. *Deutsch. Gesundh.* 25(43):2048-2053, 1970.

Between 1958 and 1967, viral hepatitis was the most commonly reported occupational disease in the Dresden area of East Germany, accounting for 60% of all occupational diseases, and was 4 time more common than tuberculosis. Most cases occurred in the fall and winter months and, although viral hepatitis was endemic during the entire period, epidemics occurred in 1960 and 1965. The average age of the patients was about 30 yr. Only kindergarten teachers were affected significantly more often than the general population. The morbidity for physicians and paramedical personnel was about the same as that for the general population. Of the 446 patients with occupational viral hepatitis, 367 were hospitalized for an average of 50 days, and 190 of them were unable to work for an average of 125 days.

1574 THE USE OF GAMMA GLOBULIN AS PROPHYLAXIS AGAINST INFECTIOUS HEPATITIS IN INDUSTRY. (E.) McDonagh, T. J. *Med. Bull. Stand. Oil Co.* 30(3):197-213, 1970.

The composition and side effects of γ-globulin, its use for overseas travel and residence, the incidence of hepatitis in employees of a large company working throughout the world, and the effectiveness of γ-globulin in preventing infectious hepatitis are surveyed. GG has been demonstrated to be an effective prophylactic (modifying agent) in infectious hepatitis, and its use when there is an increased risk of contracting infectious hepatitis is now acceptable medical practice. The use of γ-globulin is not associated with an undue occurrence of side reactions. It is effective in modifying the increased risk associated with overseas travel and residence. However, based upon the results of this survey, U.S. industries seemingly have not offered protection to the majority of their employees in areas considered highly endemic for infectious hepatitis.

1575 THE ARTHRITIS OF VIRAL HEPATITIS. (E.) Fernandez, R. (U. Chicago Dept. Med., Ill.) and D. J. McCarty. *Ann. Intern. Med.* 74(2):207-211, 1971.

Two cases of polyarthritis and one of polyarthralgia with associated urticaria and hepatitis were clearly diagnosed only when jaundice appeared. The arthritis was a symmetrical polyarthritis chiefly affecting the distal joints of the extremities, but also affecting the larger appendicular and spinal joints. The joint fluid was of a noninflammatory type; the effusions possibly represented sympathetic exudation of fluid into the joint space adjacent to the area of primary inflammation. The character of the fluid and the prominence of periarticular swelling suggest that the arthritis of viral hepatitis is a periarthritis. All 3 cases were negative for Australia (serum hepatitis) antigen. Whether this or similar viruses with arthritogenic potential play a role in the etiology of other joint diseases is unknown.

1576 GLUCOSE HOMEOSTASIS IN VIRAL HEPATITIS. (E.) Felig, P. (Yale U. Sch. Med., New Haven, Conn.), V. Brown, R. A. Levine and G. Klatskin. *N. Engl. J. Med.* 283(26):1436-1440, 1970.

Patients with hepatitis had a significantly lower fasting plasma glucose level than controls, and 8 of 15 hepatitis patients with levels below 60 mg/100 ml also showed a significant reduction in plasma insulin. Fifteen, 30 and 45 min after glucagon administration, elevation in plasma glucose was markedly reduced in the hepatitis group. Glucagon also failed to elicit a consistent reduction in plasma amino acid levels in the hepatitis group. Liver glycogen content was decreased in all liver biopsy sections in the hepatitis group; the decrease was due both to a loss of parenchymal cells and to a decreased content of glycogen in the remaining cells. Blood glucose response to glucagon and findings on liver biopsy were consistent with the marked impairment in liver glycogen synthesis, a disorder apparently due to hepatocellular dysfunction. Failure to observe a consistent reduction in plasma amino acids in the hepatitis group suggests that gluconeogenesis, as well as glycogen synthesis, is seriously impaired in acute viral hepatitis.

1577 AUSTRALIA ANTIGEN IN PATIENTS WITH VARIOUS LIVER DISEASES. (E.) Elling, P. (Blegdams Hosp., Copenhagen, Denmark), J. O. Nielsen and O. Dietrichson. *Acta Pathol. Microbiol. Scand.* [*B*] 78(6):657-663, 1970.

Australia (Au)-antigen was present in 82% of cases of serum hepatitis and in 37% of those of infectious hepatitis in a study of sera obtained during the first 2 weeks after the onset of the disease. In more than half of the Au-antigen-positive patients with acute viral hepatitis, the results changed to negative within the period of observation, and the Au-reaction became negative in the majority of patients 4-5 weeks after onset of the disease. Au-antigen was demonstrated in 3 of 6 patients with chronic hepatitis and in 10 of 190 patients with liver cirrhosis. After termination of the disease, the presence of Au-antibody was not demonstrable (except in 1 of 106 patients with acute hepatitis). Apparently, the incidence of Au-antigen in the various forms of hepatitis may vary greatly if the criteria used for classification of serum hepatitis and infectious hepatitis are not precisely defined.

1578 AUSTRALIA ANTIGEN IMMUNE COMPLEXES IN PATIENTS WITH DIFFERENT FORMS OF HEPATITIS. (E.) Brzosko, W. J. (State Inst. Hyg., Warsaw, Poland), K. Madalinski, K. Krawczynski, H. Skwarska and A. Nowoslawski. *J. Infect. Dis.* 123(3):251-256, 1971.

Australia (Au)-antigen immune complexes or free antibody to Au-antigen, as measured by positive immunofluorescence tests performed on liver, were found in 90% of the sera of patients with acute viral hepatitis and in 100% of sera of patients with chronic hepatitis. Sera from leukemia patients which were Au-antigen-positive by immunodiffusion were negative with immunofluorescence tests. Apparently Au-antigen, as measured by Au-antigen immune complexes, occurs at the same frequency in patients with chronic hepatitis as in patients with acute viral hepatitis. The pathogenesis of these liver diseases can best be explained in terms of serum "sickness"; the elimination, by a humoral immune mechanism rather than by a direct cytopathic effect of the virus, of liver cells which may manufacture Au-antigen may be responsible for these 2 severe diseases of man.

1579 FAECAL S.H. (AUSTRALIA) ANTIGEN IN ACUTE HEPATITIS. (E.) Grob, P. J. (Univ. Hosp., Zurich, Switzerland) and H. Jemelka. *Lancet* 1(7692):206-208, 1971.

In each of 11 patients with sporadic acute hepatitis, whose first serum sample was positive for Australia (Au)-antigen, the antigen was identified in the feces on several occasions. Au-antigen persisted longer in the feces than in the corresponding sera in 8 patients; the reverse was true in 3 patients. In 2 patients, 55 and 48 days following onset of symptoms, fecal antiserum hepatitis antibodies were detected. Most patients demonstrated antibodies against smooth muscle in the sera at the beginning of the disease. Levels of antigen β,A first decreased, then rose above normal, and finally returned to normal; the lowest values coincided with the highest values of transaminase. The greatest immunological abnormality seems to coincide with the peak of disease, while the appearance of serum hepatitis antigen usually precedes the disease; this indicates that not the virus itself, but the immunological reaction of the host, might be responsible for the symptoms.

1580 A HEPATITIS EPIDEMIC IN A DIALYSIS UNIT. OCCURRENCE AND PERSISTENCE OF AUSTRALIA-ANTIGEN AMONG PATIENTS AND STAFF. (E.) Nordenfelt, E. (U. Lund Dept. Med. Microbiol., Sweden), T. Lindholm and E. Dahlquist. *Acta Pathol. Microbiol. Scand.* [*B*] 78(6):693-700, 1970.

Blood samples were taken from staff members and patients during an epidemic of hepatitis in a dialysis unit, and examined for increases in glutamic pyruvic transaminase (GPT) and for the occurrence of Australia (Au)-antigen. The disease was more severe, but shorter in duration, in the 30 staff members than in the 30 patients undergoing hemodialysis in whom hepatitis was also diagnosed. Au-antigen appeared in association with the clinical signs of hepatitis in staff members, and it usually disappeared within 12 days of the onset of the disease, long before the appearance of clinical signs. Sera from patients with renal disease usually exhibited the antigen 5 weeks before other signs of hepatitis developed, and maintained the antigen for long periods.

1581 INFLUENCE OF SERUM HEPATITIS ON HAEMOGLOBIN LEVEL IN PATIENTS ON REGULAR HAEMODIALYSIS. (E.) Kolk-Vegter, A. J. (U. Amsterdam Dept. Intern. Med., Netherlands), E. Bosch and A. M. van Leeuwen. *Lancet* 1(7698): 526-528, 1971.

Eleven of 45 patients in terminal renal failure being treated by regular hemodialysis developed signs of liver injury due to serum hepatitis. During the period of liver injury (monitored by increased SGPT levels), the hemoglobin level increased significantly in most patients. In these patients, the liver damage may have influenced erythropoietin metabolism.

1582 HEPATITIS AS A PROBLEM OF CIVILIZATION. (Ger.) Klutsch, K. (Univ. Med. Clin., Wurzburg, Germany) and U. Von Haefen. *Off. Gesundheitsw.* 32(10):520-527, 1970.

1583 ACUTE INFECTIOUS HEPATITIS IN CHILDREN. EPIDEMIOLOGICAL DATA IN MANTUA AND ITS PROVINCE, AND CLINICO-STATISTICAL STUDIES ON 248 SUBJECTS ADMITTED TO THE HOSPITAL IN THE FOUR-YEAR PERIOD 1965-1968. (It.) Accordi, V. (Carl Poma Hosp. Inst., Mantua, Italy), E. Casali, L. Gaioni and R. Bertelli. *G. Mal. Infett. Parassi* 22(5):334-347, 1970.

1584 VIRAL HEPATITIS. (Rev.) (Fr.) Cros, C. and A. L. Volpillac. *Rev. Infirm. (Paris)* 20(5):423-430, 1970.

1585 VIRAL HEPATITIS. ELECTRON MICROSCOPE STUDY. (Sp.) Trevino Garcia Manzo, N. (IMSS Natl. Med. Ctr., Mexico City, Mexico) and I. P. Ruiz De Chavez. *Prensa Med. Mex.* 35(5-6):197-212, 1970.

1586 THERAPEUTIC PRINCIPLES IN VIRAL HEPATITIS. (Rev.) (Fr.) Varay, A. (Beaujon Hosp., Clichy, France). *Gaz. Med. Fr.* 77(26):5527-5528, 1970.

1587 DANGERS OF TETRACYCLINES AND CORTICOSTEROIDS IN VIRAL HEPATITIS. (E.) Antia, F. P. *Bombay Hosp. J.* 12(3):29-30, 1970.

1588 PATTERN OF NECROSIS IN ACUTE VIRAL HEPATITIS. PROGNOSTIC VALUE OF BRIDGING. (SUBACUTE HEPATIC NECROSIS). (E.) Boyer, J. L. (Yale U. Sch. Med., New Haven, Conn and G. Klatskin. *N. Engl. J. Med.* 283(20): 1063-1071, 1970.

1589 PORTAL HYPERTENSION AND HEPATITIS. (Sp.) Trakál, E. (Cordoba Hosp., Argentina), G. A. Ortiz and H. A. Parodi. *Rev. Esp. Enferm. Apar. Dig.* 32(6):665-674, 1970.

1590 ELECTRON MICROSCOPIC OBSERVATIONS ON VIRUS-LIKE PARTICLES ASSOCIATED WITH SH ANTIGEN. (E.) Jokelainen, P. T. (New York Med. Coll., N. Y.), K. Krohn, A. M. Prince and N. D. C. Finlayson. *J. Virol.* 6(5):685-689, 1970.

1591 HEPATITIS-ASSOCIATED ANTIGEN IN LIVER DISEASE IN KENYA. (E.) Bagshawe, A. F. (Kenyatta Natl. Hosp., Nairobi, Kenya), A. M. Parker and A. Jindani. *Br. Med. J.* 1(5740):88-89, 1970.

1592 INVESTIGATIONS ON AUSTRALIA ANTIGEN (HEPATITIS) IN HUMAN SERUM. (E.) Balş, M. G. (2nd Clin. Communicable Dis., Bucharest, Rumania), C. Bocarnea and L. Hagiescu. *Rev. Roum. Inframicrobiol.* 7(2):131-134, 1970.

1593 REVIEW: ANTIGENS AND VIRUSES IN ACUTE HEPATITIS. (Rev.) (E.) Zuckerman, A. J. (London Sch. Hyg. Trop. Med.), P. E. Taylor and R. G. Bird. *Clin. Exp. Immunol.* 7(4):439-452, 1970.

1594 DEMONSTRATION OF VIRUS-LIKE PARTICLES IN THE BLOOD SERUM OF MONKEYS WITH EXPERIMENTAL INFECTIOUS HEPATITIS. (Ger.) Apodaca, J. (Robert Koch Inst., Berlin, Germany), W. Lange, G. Tochtermann and H. Kohler. *Zentralbl. Bakteriol.* [*Orig.*] 214(4):480-481, 1970.

1595 INCLUSION BODY HEPATITIS IN CHICKENS. (E.) Howell, J. (Dept. Agric. Vet. Serv. Div., Edmonton, Alberta, Canada), D. W. MacDonald and R. G. Christian. *Can. Vet. J.* 11(5):99-101, 1970.

1596 EPIDEMIOLOGY OF SERUM HEPATITIS. (Ger.) Heidel, G. (Hohenstein/Ernstthal, Germany) and H. Reinfried. *Z. Gesamte Hyg.* 16(11): 866-868, 1970.

See also numbers: 1202, 1249, 1250

CHRONIC HEPATITIS

1597 SERUM-HEPATITIS ANTIGEN IN CHRONIC HEPATITIS AND PRIMARY BILIARY CIRRHOSIS. (E.) Kaplan, M. M. (New England Ctr. Hosp., Boston, Mass.) and G. Grady. *Lancet* 1(7691): 159-161, 1971.

Sera from 56 patients with chronic, nonalcoholic, nonobstructive liver disease were examined for the presence of serum hepatitis (SH) antigen by immunodiffusion, microtitre complement fixation, and high voltage immunoelectro-osmophoresis. Patients with persistent hepatitis exhibited a high prevalence of SH-antigen (80%), while all other groups were low. No SH-antigen or antibody to SH was found in 10 patients with primary biliary cirrhosis. SH-antigen was detected in only 2 of 34 patients with chronic active hepatitis. Detection of SH antigen was not significantly increased by the use of 3 different immunological methods.

1598 THERAPEUTIC TRIAL OF ANTITHYMOCYTIC GLOBULINS IN 5 CASES OF CHRONIC HEPATITIS. (Fr.) Gateau, P. (St. Antoine Hosp., Paris), A. Eyquem and Y. Hecht. *Rev. Med. Chir. Mal. Foie* 45(6):311-323, 1970.

1599 MORPHOLOGICAL CHANGES OF THE LIVER IN RHEUMATOID ARTHRITIS (AUTOPSY AND BIOPSY DATA). (Rus.) Repina, G. A. *Arkh. Patol.* 32(7):58-62, 1970.

See also numbers: 1493, 1577, 1578, 1608

CIRRHOSIS

1600 GLOMERULAR RENAL LESIONS AND CIRRHOSIS OF THE LIVER. PRELIMINARY REPORT ON HISTOLOGICAL LESIONS OF THE KIDNEY IN BIOPSIES TAKEN FROM 20 PATIENTS WITH CIRRHOSIS. (Fr.) Manigand, G. (Bicetre Hosp., Kremlin-Bicetre, France), L. Morel-Maroger, J. Simon and M. Deparis. *Rev. Eur. Etud. Clin. Biol.* 15(9): 989-996, 1970.

Histological studies were made of renal biopsies from 20 patients (18 men and 2 women, aged 35-68 yr), 14 of whom had cirrhosis with or without fatty liver and 6 of whom had fatty liver. Liver disease was caused by alcoholism in 19 cases, and the cause was unknown in 1. Of the 19 patients with adequate renal biopsy material, 15 had glomerular lesions, 7 had arteriosclerotic lesions, only 1 had tubular lesions (associated with severe interstitial fibrosis), and 16 had interstitial lesions. Immunofluorescent studies made in 6 cases revealed that 4 of these patients had intercapillary deposits of IgA, IgG, and β-I-C globulin. The mechanism involved in formation of glomerular lesions in alcoholic liver disease is unknown, but these lesions may result from dysproteinemias secondary to the liver disease.

1601 7-METHYLGUANINE AND OTHER MINOR URINARY PURINES: VALUES FOR NORMAL SUBJECTS FROM ISRAEL, GAZA, AND KENYA, AND FOR PATIENTS WITH CANCER OF VARIOUS ORGANS OR CIRRHOSIS OF THE LIVER. (E.) Mirvish, S. S. (U. Nebraska Coll. Med., Omaha), J. Medalie, C. A. Linsell, E. Yousuf and S. Reyad. *Cancer* 27(3):736-742, 1971.

Normal subjects from Israel, Gaza, and Kenya showed similar urine values for adenine, 7-methylguanine, hypoxanthine, and xanthine; differences observed for the minor methylated purines probably were artifacts. Results were similar to those found in the U. S. and Britian, and do not suggest that such analyses are useful for detecting exposure to carcinogenic alkylating agents, except at large doses. Urine from 30 subjects with cirrhosis of the liver or cancer of various organs showed a depressed excretion of hypoxanthine and xanthine relative to that of adenine and 7-methylguanine. Some of these subjects (the Arabs) also showed an increased excretion of 8-hydroxy-7-methylguanine. The depression of urinary hypoxanthine and xanthine may be due to an increase in xanthine oxidase activity. The increase in certain methylated purines could be due to elevated nucleic acid methylation in cirrhotic liver and in tumor tissue since elevated levels of methylated bases occur in transfer RNA of some tumor tissues.

1602 METABOLISM OF 5HT BY THE ISOLATED PERFUSED SMALL INTESTINE OF NORMAL AND CIRRHOTIC RATS. (E.) Pentikäinen, P. (U. Helsinki Dept. Pharmacol., Finland). *Ann. Med. Exp. Biol. Fenn.* 48(4):266-272, 1970.

Normal, isolated rat small intestine metabolized ^{14}C-5-hydroxytryptamine efficiently by multiple routes; the major metabolic pathway was the phenolic glucuronide conjugation of 5-hydroxytryptamine, reflecting the high overall activity of glucuronide synthesis in this tissue. More unmetabolized ^{14}C-5 hydroxytryptamine was present in the serosal fluid in perfusions of cirrhotic rat intestine than of control rat material. Sulfate conjugation was increased in the cirrhotic rat intestine whereas glucuronide conjugation was decreased (direction of changes were opposite in cirrhotic liver). The lack of ability to transport 5-hydroxytryptamine against a concentration gradient, as demonstrated in cirrhotic rats, is probably related to the diminished metabolic capacity of the intestine of rats with cirrhosis. Orally administered 5-hydroxytryptamine is, apparently, principally metabolized in the small intestine.

1603 STUDIES WITH ION EXCHANGE CALCIUM ELECTRODES. III. THE STATE OF SERUM CALCIUM IN PATIENTS WITH CIRRHOSIS. (E.) Moore, E. W. (Med. Coll. Virginia, Richmond). *Gastroenterology* 60(1):43-54, 1971.

In both normal and advanced cirrhotic groups, there was no apparent relationship between serum-ionized and total calcium concentrations. Serum-ionized calcium was more variable in cirrhotic patients and, on the average, was reduced about 5%. Serum total calcium, protein bound calcium, and albumin were also significantly reduced; total ultrafiltrable calcium and diffusible calcium complexes were significantly increased. The increase in diffusible calcium complexes was not due to citrate or phosphate, and the complexing ligand remains unidentified. As in normal subjects, variation in total calcium was almost entirely accounted for by variation in protein bound calcium, the latter being linearly related to serum albumin. Serum total calcium was, therefore, an indirect measure of albumin. In contrast to normal subjects, there was no detectable binding to globulins in patients with cirrhosis, despite elevated globulin levels. This observation strongly suggests deficiency of a normal globulin. A model is presented for the relation between total calcium and each of the 3 calcium fractions of serum as a function of serum albumin, and an equation is presented for estimating protein-bound calcium without ultrafiltration.

1604 TETANUS ANTITOXIN PRODUCTION AND GAMMA GLOBULIN LEVELS IN PATIENTS WITH CIRRHOSIS OF THE LIVER. (E.) Bjørnboe, M. (Bispebjerg Hosp., Copenhagen, Denmark), K. B. Jensen, I. Scheibel, A. C. Thomsen and M. W. Bentzon. *Acta Med. Scand.* 188(6):541-546, 1970.

No significant difference was found in antibody response to tetanus toxoid in 27 patients with hepatic cirrhosis and 28 controls. No relation could be found between antibody response and serum levels of immunoglobulins A, G, and M. No correlation was found between antibody response and age or sex in either the cirrhotics or the controls. Apparently, alcohol did not affect antitoxin response since all of the female cirrhotics were nonalcoholics and all of the males were alcoholics. These results indicate that the high γ-globulin levels found in cirrhosis are not due to increased immunological potential, but to increased antigenic influence, perhaps from breakdown products of the liver cell.

1605 CORRELATION OF HISTOLOGIC FEATURES IN TWO GROUPS OF LIVER BIOPSIES WITH CIRRHOSIS AND FATTY CHANGE THE FIRST WITH AND THE SECOND WITHOUT MALLORY BODIES. (E.) Christoffersen, P. (Community Hosp., Copenhagen, Denmark) and H. Poulsen. *Acta Pathol. Microbiol. Scand.* [*A*] 79(1):27-31, 1971.

A total of 120 percutaneous liver biopsies, all showing cirrhosis (nodular regeneration and fibrosis) and fatty change, were examined histologically. Of these, 45 showed evidence of Mallory bodies, and 34 of the 45 showed changes often seen in alcoholic hepatitis. Focal lytic necroses occurred significantly more frequently in those with Mallory bodies (96%) than in those without (53%); results were similar for acidophil bodies (82% and 49%, resp.). There was no significant differance between the groups with respect to frequency of fatty infiltration, while the frequency of lipogranuloma was significantly higher in those with Mallory bodies. This was also the case with frequency of Kupffer cell proliferation and parenchymal inflammatory cells. In the latter case, lymphocytes were frequently seen in both groups, while neutrophils were much more common in those with Mallory bodies. Total destruction of liver architecture was significantly greater in those with Mallory bodies than in those without. There was no difference in portal inflammation, bile duct proliferation, fibrosis, cholestasis, or iron deposits between the two liver biopsy groups.

1606 CLINICAL DIAGNOSIS OF ALCOHOLIC FATTY LIVER. (E.) Devenyi, P. (Alcoholism Drug. Addict. Res. Found., Toronto, Ontario, Canada), J. Rutherdale, G. Sereny and J. S. Olin. *Am. J. Gastroenterol.* 54(6):597-602, 1970.

In a series of 100 chronic alcoholic patients, liver biopsy showed results of 65% fatty liver, 1% cirrhosis, and 34% normal liver. SGOT and SGPT values were significantly elevated in 75 and 50%, resp., of the patients with fatty liver. A BSP retention exceeding 8% was observed in 60% of the patients with fatty liver. In addition to reversible hepatomegaly, a transient abnormality in at least 2 of 3 tests (SGOT, SGPT, and BSP) indicates with reasonable certainty the presence of fatty liver in recent alcoholics, although the absence of abnormal values does not rule out fatty liver. Since fatty liver has not been shown to progress directly to cirrhosis, it is important that the 2 are differentiated from each other clinically.

1607 CIRRHOSIS AND DIABETES. II. ASSOCIATION OF IMPAIRED GLUCOSE TOLERANCE WITH PORTAL-SYSTEMIC SHUNTING IN LAENNEC'S CIRRHOSIS. (E.) Conn, H. O. (Yale U. Sch. Med., New Haven, Conn.), W. Schreiber and S. G. Elkington. *Am. J. Dig. Dis.* 16(3):227-239, 1971.

Glucose tolerance tests (administered p.o. and i.v.) were performed and glucose clearance curves were calculated for 145 patients with cirrhosis; some patients had overt diabetes and some had been subjected to portacaval shunts. Of this group, 80% had abnormal oral tolerance curves, 19% had abnormal i.v. tolerance curves, and 68% had abnormal glucose clearance. Impaired p.o. glucose tolerance was significantly correlated with the presence of ascites, esophageal varices, hypoalbuminemia, and impaired ammonia tolerance. There was no significant correlation with jaundice, presence of spider angiomata, hepatomegaly, or other liver function tests which are somewhat less specific for portal hypertension. When replicate glucose tolerance tests were performed before and after portacaval shunt in 15 patients, improved glucose tolerance was observed after construction of the shunt in all 3 who had overt diabetes, while glucose tolerance became more abnormal after the shunt procedure in the other 12.

1608 MEASUREMENT OF HEPATIC ARTERIAL AND PORTAL VENOUS BLOOD FLOW IN HEPATIC DISEASES. (PRELIMINARY REPORT). (E.) Nakamura, T. (Tohoku U. Sch. Med., Sendai, Japan), S. Nakamura, T. Aikawa, K. Kera and K. Sasaki. *Angiology* 22(1):46-51, 1971.

The percentage of the total hepatic blood flow due to portal blood flow was determined in 38 patients with liver disease (15 with cirrhosis, 14 with chronic hepatitis, 2 with presinusoidal portal hypertension, 2 with liver cancer with and without cirrhosis, and 5 with liver metastases) and in 2 controls. Radioactive iodinated human serum albumin was continuously infused into the pulmonary artery at a constant rate, and calculations were made from plateau concentrations in the arterial and hepatic venous radioactivity curves. The average percentage of portal blood flow was significantly lower than normal in patients with cirrhosis due to an absolute decrease in portal blood flow. The decrease in portal blood flow appeared to be greatest in cirrhotic patients with marked splenomegaly. Slightly lower than normal values were found in 3 of the patients with liver cancer; this is ascribed to the arterial blood supply of the tumor tissue. The percentage of portal blood flow was within the normal range in patients with chronic hepatitis and presinusoidal portal hypertension.

1609 CLINICAL INVESTIGATION OF THE PORTACAVAL SHUNT: IV. A REPORT OF EARLY SURVIVAL FROM THE EMERGENCY OPERATION. (E.) Edmondson, H. T. (VA Hosp., Augusta, Ga.), F. J. Jackson, G. L. Juler, B. Sigel and E. B. Perrin. *Ann. Surg.* 173(3):372-380, 1971.

Factors associated with operative mortality in cirrhotic patients receiving emergency surgery (end-to side portocaval shunt) for severe variceal hemorrhage were investigated. Patients with physical (ascites, severe jaundice, cachexia) and laboratory (hematocrit, prothrombin time) evidence of advanced liver injury survived surgery poorly. In patients whose initial hemorrhage was considered severe (low initial hematocrit and high preoperative blood transfusion requirements), the mortality rate was higher than in those patients whose hemorrhage was less profuse. There was a higher survival rate among patients in whom the postshunt portal pressure reflected notable reduction of portal hypertension. There was a sharp rise in 30-day mortality among patients for whom the duration of operating time, for various reasons, extended beyond 6 hr. The accuracy of percutaneous splenoportography in this series (86% diagnostic accuracy) compares favorably with examples described previously.

1610 PORTAL DECOMPRESSION BY SIDE-TO-SIDE SPLENORENAL VENOUS ANASTOMOSIS. RESULTS IN 14 PATIENTS. (E.) Haller, J. D., H. Glick, G. L. Hallman and D. A. Cooley (Texas Heart Inst., Houston). *Arch. Surg.* 102(4):316-321, 1971.

Of 14 cases of splenorenal venous anastamosis, there were no surgical deaths and only 3 hospital deaths due to liver failure, hepatic cancer, and hemorrhagic pancreatitis. In all patients, the splenorenal shunt effectively controlled active bleeding at the time of operation. Liver biopsy showed 9 patients had postnecrotic cirrhosis, 3 had Laennec's cirrhosis, and 2 developed biliary cirrhosis. Four of the 11 surviving patients died between 6 months and 2 yr postoperatively. Most of these deaths were due to effects of continued alcohol ingestion. Postoperative complications were few and minor, considering the severity of illness and magnitude of surgery. All 7 patients with hypersplenism quickly reverted to normal hematologic status after operation. The side-to-side splenorenal shunt has several advantages: technical ease and accessibility; preservation of the spleen; creation of a large anastomosis; and both portal and hepatic decompression.

1611 GENERAL INCIDENCE, GEOGRAPHICAL DISTRIBUTION AND ETIOLOGY OF CIRRHOSIS IN THE IVORY COAST. COMPARATIVE STUDY WITH PRIMARY LIVER CANCER. (Fr.) Lebras, M. (CHU Abidjan, Treichville, Ivory Coast), M. Bouvry and B. Beda. *Bull. Soc. Pathol. Exot.* 63(2): 273-279, 1970.

1612 ELECTRON MICROSCOPICAL AND IMMUNOLOGICAL OBSERVATIONS ON THE SERUM HEPATITIS (S.H.) ANTIGEN IN PRIMARY BILIARY CIRRHOSIS. (E.) Krohn, K. (Cornell U. Med. Coll., New York, N. Y.), N. D. C. Finlayson and P. T. Jokelainen. *Lancet* 2(7669):379-385, 1970.

1613 CASE OF BANTI'S SYNDROME WITH ATYPICAL SWELLING OF THE SPLEEN. (Jap.) Tsushima, M. (Keio U. Sch. Med., Tokyo), S. Kuroda and J. Arai. *Nippon Naika Gakkai Zasshi (J. Jap. Soc. Intern. Med.)* 59(6):529-532, 1970.

1614 ACTIVITY OF SERUM AND LIVER ENZYMES IN DIFFERENT STAGES OF OBSTRUCTIVE JAUNDICE AND LIVER CIRRHOSIS IN EXPERIMENTAL ANIMALS. (Rus.) Gromashevskaia, L. L. (Sci. Res. Inst. Infect. Dis., Kiev, USSR), Z. P. Gette and I. D. Ilaschuk. *Biull. Eksp. Biol. Med.* 70(11):43-48, 1970.

1615 THE RELATIONSHIP BETWEEN THE FREE POOL OF PROLINE AND COLLAGEN CONTENT IN HUMAN LIVER CIRRHOSIS. (E.) Kershenobich, D. (Natl. Inst. Nutr., Mexico City, Mexico), F. J. Fierro and M. Rojkind. *J. Clin. Invest.* 49(12): 2246-2249, 1970.

1616 VITAMIN B_{12} CONCENTRATION IN SERUM AND LIVER TISSUE IN LIVER CIRRHOSIS. (Pol.) Gorski, M. M. (Med. Acad. 1st Clin. Intern. Dis., Gdansk, Poland) and A. Niemiro. *Pol. Tyg. Lek.* 25(37-38):1374-1376, 1970.

1617 Lactobacillus acidophilus IN THE TREATMENT OF DIARRHEA OF ALCOHOLIC CIRRHOSIS. (Fr.) Tete, R., A. Sedaillan and J. Barthe. *Cah. Med. Lyon.* 46(29):2373-2376, 1970.

1618 AUGMENTED SECRETIN TEST IN PATIENTS WITH ALCOHOLIC CIRRHOSIS OF THE LIVER. (Por.) Bordalo, O., M. Leonor Gomes and J. Ferreira. *J. Soc. Cienc. Med. Lisboa* 134(2): 105-107, 1970.

1619 CLINICAL FEATURES OF ALCOHOLIC FATTY LIVER. (Ger.) Coppo, M. (U. Modena Inst. Clin. Med., Italy), F. Manenti and N. Carull *Therapiewoche* 20(40):2373-2384, 1970.

1620 HEPATIC FIBROSIS. CORRELATION OF BIOCHEMICAL AND MORPHOLOGIC INVESTIGATIONS. (Rev.) (E.) Popper, H. (City U. Mt. Sinai Sch. Med., New York, N. Y.) and S. Udenfriend. *Am. J. Med.* 49(5):707-721, 1970.

See also numbers: 1250, 1647, 1799

1621 CHANGING STATE OF GALLSTONE DISEASE IN JAPAN. COMPOSITION OF THE STONES AND TREATMENT OF THE CONDITION. (E.) Nakayama, F. (Kyushu U. Fac. Med., Fukuoka, Japan) and H. Miyake. *Am. J. Surg.* 120(6):794-799, 1970.

The gradual change in gallstone composition in Japan over the past 40 yr (1927-1967) was clearly demonstrated, showing that stones were once predominantly composed of bile pigment, whereas at present they are mostly composed of cholesterol. Furthermore, recalculation of the autopsy incidence of gallstones in Japan revealed that the incidence of cholesterol stone, the predominant gallstone in western nations, has almost quadrupled during the past 40 yr and is approaching that of western nations. Factors responsible for the change, although not clearly understood, may include increased fat and protein intake in recent years and accelerating urbanization in postwar Japan which decreases the chance of bacterial contamination; in contrast, infection of the biliary tract has long been regarded as a cause of the formation of bile pigment stone. The treatment for cholelithiasis is determined by whether the gallstone is composed of cholesterol or bile pigment. Disease in patients with cholesterol stones seems to be metabolic in origin and to originate in the gallbladder. Disease in which bile pigment stones are observed seems to be closely associated with bacterial infection, and confined to the common bile duct.

1622 GLYCOPROTEINS AND SULFATED GLYCOPROTEINS ISOLATED FROM HUMAN BILE. (E.) Matsushiro, T. (Tohoku U. Sch. Med., Sendai, Japan), T. Nemoto, M. Endo and Z. Yosizawa. *Clin. Chim. Acta* 30(3):645-655, 1970.

Bile samples were collected from patients with gastric cancer and gastric ulcer without any disease of the liver or biliary tract, and from patients with chronic hepatitis, liver cirrhosis, and cholecystolithiasis and analyzed for glycoprotein content. Normal control bile did not give any noticeable amount of papain-digested glycopeptide when dialyzed against distilled water, although all abnormal samples did. The water-soluble glycoprotein fraction was predominant in most of the abnormal bile samples. The glycoprotein and glycopeptide fractions were separated into subfractions by stepwise elution from diethylaminoethyl-Sephadex A-50 or Dowex 1-X_2 with NaCl. All the subfractions contained hexose, hexosamine, and protein or peptide as the major constituents with small amounts of L-fucose, and each showed a single band after cellulose acetate electrophoresis. Fractions 0.1 and 0.3 appeared to be glycoproteins (or glycopeptides), while fractions 0.5 and 0.7 were sulfated glycoproteins (or glycopeptides). Small amounts of sulfated glycoprotein-glycosaminoglycuronans and acidic glycosaminoglycuronans, as well as large amounts of sulfated glycoproteins (or glycopeptides) were isolated from abnormal bile samples. Only glycoproteins were isolated from the normal control bile. The acidic components may play an important role in gallstone formation.

1623 HEPATIC AND RENAL EXCRETORY METABOLISM OF BILE SALTS: A BACKGROUND FOR UNDERSTANDING STEROID-INDUCED CHOLESTASIS. (E.) Despopoulos, A. (U. New Mexico Sch. Med., Albuquerque). *J. Pharmacol. Exp. Ther.* 176(2): 273-283, 1971.

Tubular excretion of bile salts in chickens could not be established; however, all of the bile salts used (including cholate, glycocholate, and taurocholate) inhibited tubular excretion of both phenolsulfonphthalein and of N-methylnicotinamide. Several bile salts (dehydrocholate and taurodehydrocholate) unequivocally depressed phenolsulfonphthalein excretion to a greater extent than N-methylnicotinamide. Increasing doses of bile salts produced a logarithmic depression in the ability of rabbit kidney tissue slices to accumulate 4-aminohippuric acid, but the order of inhibitory potency was different from that in chickens. In isolated perfused rat liver, taurocholate was concentrated in bile by a process which was sensitive to inhibition by probenecid. In the same system, infused cholate was excreted exclusively as taurocholate. Synthesis of cholate from cholesterol was achieved with mitochondrial fraction from liver homogenates. None of the steroids interfered with taurocholate excretion nor with conversion of cholesterol to cholate, but they did inhibit synthesis of taurocholate from cholate. This influence on a fundamental reaction in the process of bile formation may account for cholestasis produced by steroids.

1624 RECONSTRUCTIVE ANALYSIS OF THE CHOLANGIOLAR AREA IN SURGICAL JAUNDICE WITH REFERENCE TO INTRACTABLE JAUNDICE AFTER BILIARY DRAINAGE. (E.) Maki, T. (Tohoku U. Sch. Med., Sendai, Japan), H. Yamauchi, Y. Suda and T. Sato. *Am. J. Surg.* 120(4):551-557, 1970.

The 3-dimensional structure of the cholangiolar system in liver specimens from 4 patients with severe obstructive jaundice was studied by image reconstruction from serial sections. All 4 patients had extrahepatic obstructive jaundice due to carcinoma of the intra- or extrapancreatic bile duct or to choledocholithiasis. In 2 cases, interruption of cholangioles with the formation of ductular fragments was observed. This finding apparently accounts for trapping of the bile within the liver, one of the causes of persistent jaundice in these cases. Disruption of bile ductules, formation of ductular fragments, and stenosis appear to be due to destruction of bile ductules either directly, or as the result of inflammatory exudate and fibrosis caused by bile inhibition around cholangioles and small bile ducts. Disruption of small bile ducts may be caused by bile plug formation. These findings are apparently manifestations of secondary intrahepatic cholestasis.

1625 ENDOTOXIN AND ACUTE RENAL FAILURE ASSOCIATED WITH OBSTRUCTIVE JAUNDICE. (E.) Wardle, E. N. (Roy. Victoria Infirm., Newcastle upon Tyne, England) and N. A. Wright. *Br. Med. J.* 4(5733):472-474, 1970.

Eighteen of 20 rats with obstructive jaundice died following a single dose of endotoxin. One third of these animals demonstrated rebound defibrination and 1/3 showed absolute defibrination. The rats with obstructive jaundice only showed early toxic renal tubular degenerative changes. They showed massive fibrin deposition in the renal vasculature, with sparing of the glomerular capillaries. Endotoxin-treated animals also showed deposition of fibrin in the hepatic sinusoids; death probably was due to a cardiotoxic action of the endotoxin. Animals with obstructive jaundice tend to develop intravascular coagulation because the clearance of endotoxin is delayed, and probably because there is already some hepatic cell necrosis present. It is concluded that bacteremia may have particular significance in the genesis of some cases of acute renal failure in obstructive jaundice.

1626 ACUTE RENAL FAILURE COMPLICATING BILIARY TRACT DISORDERS. (E.) Hanberg Sørensen, F. (Univ. Dept. Surg. L, Aarhus, Denmark), J. Boné Andersen, J. Ørnsholt and H. Skjoldborg. *Acta Chir. Scand.* 137(1):87-91, 1971.

Results of treatment of 42 patients with acute renal failure associated with biliary tract disease over 15 years are studied. Renal function was restored in 21 of the 42 patients without surgery; 3 died immediately afterwards and 18 were discharged from the dialysis unit. Only in those patients who underwent a radical surgical procedure, whether before or after dialysis, was renal function restored (21 of 26). All patients who underwent palliative surgery, or who were treated conservatively, died without restoration of renal function (16 patients). Twenty-one of the 26 patients with uncomplicated and complicated choledocholithiasis or acute cholecystitis with abscess or perforation developed insufficiency before operation. Onset in the remaining 5 patients was between 1 and 5 days postoperatively, probably due to operative errors and complications. The lower the blood urea value on admission, the better was the chance of restoration of renal function.

1627 GALLBLADDER DISEASES AND THEIR RELATION TO ENDOCRINE DISEASES. (Rev.) (Sp.) Martinez Falero, J. (Sch. Med., Madrid, Spain) and A. Fernandez Cruz. *Arch. Fac. Med. Madrid* 18(4):345-348, 1970.

1628 THE UNRECOGNIZED SIGNIFICANCE OF PAPILLOMAS, POLYPS, AND ADENOMAS OF THE GALLBLADDER. (E.) Sawyer, K. C. (Presbyteri Med. Ctr., Denver, Colo.). *Am. J. Surg.* 120(5): 570-578, 1970.

1629 PROLIFERATIVE EFFECT OF A CARCINOID ON GALLBLADDER EPITHELIUM. (Ger.) Dirschmid, K. (Gen. Polyclin. Pathol. Bacteriol. Inst., Vienna, Austria). *Zentralbl. Allg. Pathol.* 113(4):441-444, 1970.

1630 CARCINOMA OF THE AMPULLA OF VATER. (E.) Jordan, G. L., Jr. (Baylor Coll Med., Houston, Tex.) and B. E. Simons. *Tex. Med.* 66(8):70-73, 1970.

1631 ANOMALIES OF THE BILE DUCTS. (Sp.) Sonzini Brandan, C. P. (San Roque Hosp., Cordoba, Argentina). *Prensa Med. Argent.* 57(15):719-723, 1970.

1632 DISEASES OF THE BILIARY TRACT IN ELDERLY SUBJECTS. (Ger.) Strik, W. O. (U. Wurzberg Med. Polyclin., Germany), H. Pusch, K. Fleischer and G. Von Forster. *Z. Gerontol.* 3(4):261-271, 1970.

1633 SERUM GAMMA-GLUTAMYL TRANSPEPTIDASE: A SENSITIVE INDICATOR OF DISEASES OF THE HEPATOBILIARY SYSTEM. (Dut.) Kammeraat, C. (Protestant Nursing Home, Breda, Netherlands). *Ned. Tijdschr. Geneeskd.* 114(4):1814-1816, 1970.

1634 SURGICAL TREATMENT OF CHOLEDOCHAL CYST. (E.) Kasai, M. (Tohoku U. Sch. Med., Sendai, Japan), Y. Asakura and Y. Taira. *Ann. Surg.* 172(5):844-851, 1970.

1635 CHOLELITHIASIS IN THALASSEMIA MAJOR. (E.) Dewey, K. W. (Cornell U. Med. Coll., New York, N. Y.), H. Grossman and V. C. Canale. *Radiology* 96(2):385-388, 1970.

1636 CASE OF MECHANICAL ILEUS CAUSED BY A GALLSTONE. (Pol.) Borowski, L. (E. Biernackiego City Hosp., Pabianice, Poland). *Wiad. Lek.* 23(14):1237-1238, 1970.

1637 A METHOD FOR THE EXPULSION OF STONES RETAINED IN THE COMMON BILE DUCT. (E.) Fennessy, J. J. (U. Chicago Dept. Radiol., Ill.) and K. D. You. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):256-259, 1970.

1638 CHOLAGOGUES AND CHOLERETICS. (E.) Hunt, T. (St. Mary's Hosp., London). *Practitioner* 206(1231):51-55, 1971.

1639 DIAGNOSIS OF OBSTRUCTIVE JAUNDICE. (E.) Barrett, P. (U. California Sch. Med. Health Sci. Ctr., Los Angeles), E. W. Fonkalsrud and J. S. Clarke. *Calif. Med.* 112(5):44-58, 1970.

1640 THE ROLE OF THE TIGHT JUNCTIONS IN THE PATHOGENY OF SOME CASES OF JAUNDICE. (E.) Pavel, I. (I. Cantacuzino Hosp., Bucharest, Rumania) and A. Petrovici. *Rev. Roum. Med. Interne* 7(4):245-249, 1970.

1641 COMPARATIVE EVALUATION OF THE EFFICACY OF HEPATOBILIARY ANASTOMOSES IN OBSTRUCTIVE JAUNDICE. (Rus.) Gerasimenko, A. A. and I. A. Sytnik. *Vestn. Khir.* 105(8):63-65, 1970.

1642 PATHOGENESIS OF JAUNDICE ASSOCIATED WITH PREDOMINANTLY INDIRECT OR NON-CONJUGATED BILIRUBIN. (Rev.) (Por.) De Almeida, N., Jr. (Fed. U. Minas Gerais Sch. Med., Belo Horizonte, Brazil). *Folha Med.* 60(4):383-391, 1970.

1643 INTRAVENOUS CHOLANGIOGRAPHY IN THE DIAGNOSIS OF ACUTE CHOLECYSTITIS. (E.) Chang, F. C. (U. Utah Sch. Med., Salt Lake City). *Am. J. Surg.* 120(5):567-569, 1970.

1644 MICROELEMENTS IN THE BLOOD OF PATIENTS WITH ACUTE CHOLECYSTITIS TREATED SURGICALLY. (Rus.) Kovalev, M. M. and V. A. Kikota. *Vestn. Khir.* 105(8):53-56, 1970.

1645 RADIOLOGICAL KINESIMETRY AND FLOW MEASUREMENTS IN THE BILIARY TRACT DURING SURGERY FOR ACUTE CHOLECYSTITIS. (Rus.) Larin, V. I. and I. F. Kornienko. *Vestn. Khir.* 105(8):59-61, 1970.

See also numbers: 1073, 1204, 1257, 1258, 1259, 1261, 1262, 1497, 1674

1646 PROXIMAL GASTRIC RESECTION IN THE TREATMENT OF BLEEDING GASTRO-OESOPHAGEAL VARICES IN PATIENTS WITH PORTAL HYPERTENSION DUE TO EXTRAHEPATIC OBSTRUCTION. (E.) Rothwell-Jackson, R. L. (St. Bartholomew's Hosp., London) and A. H. Hunt. *Br. J. Surg.* 57(7):487-494, 1970.

During a 16-yr period, 28 patients (16 adults and 8 children) underwent proximal gastric resection for gastroesophageal varices caused by extrahepatic obstruction. During an average follow-up period of 10 yr, 15 had no recurrences of bleeding and only 3 had severe hemorrhages. All but 6 of these patients had undergone unsuccessful surgery 1 or more times previously for control of bleeding. Unsuccessful procedures included splenorenal anastomosis (13 cases), splenectomy (9 cases), and gastric transection (4 cases). Of the 4 patients who died, the only possible operative death was in a patient with a subphrenic abscess who died with a massive pulmonary embolus 14 weeks after surgery. Fatal hemorrhages from esophageal varices occurred in 2 patients 2.5 and 9 yr after surgery, and the remaining patient did well after surgery but died of pneumococcal septicemia 3 yr later. In addition to recurrent hemorrhages, complications in the survivors consisted of esophagitis (13 cases), anastomotic stricture (9 cases), pulmonary complications (7 cases), anastomotic leak (4 cases), subphrenic abscess (2 cases), and mesenteric thrombosis (1 case). Proximal gastrectomy is recommended for extrahepatic portal obstruction: (1) in children who are too small for splenorenal or mesocaval anastomosis when bleeding can no longer be controlled by injection of the varices through an esophagoscope; (2) in any patients in whom thrombosis involves the splenic and mesenteric veins so that shunt operations cannot be performed; and (3) in patients with recurrent hemorrhage after unsuccessful surgery.

1647 PORTAL HYPERTENSION AND BLEEDING ILEAL VARICES AFTER COLECTOMY AND ILEOSTOMY FOR CHRONIC ULCERATIVE COLITIS. (E.) Cameron, A. D. (Green Lane Hosp., Auckland, New Zealand) and D. J. Fone. *Gut* 11(9):755-759, 1970.

Two patients are described with chronic liver disease and portal hypertension in association with ulcerative colitis for which colectomy and ileostomy had been performed. Both patients developed bleeding from varices situated around the ileostomy stoma (mucocutaneous junction), and one also had esophageal varices. Each had a successful portacaval shunt performed to correct the bleeding. The occurrence of such ileal varices is uncommon, but is important as a manifestation of portal hypertension. The liver disease, although of unknown nature, appeared causally related to the ulcerative colitis. An important feature in management was the absence of clinical portasystemic encephalopathy in circumstances where this would have been expected, The absence of the colon in both patients was a significant factor contributing towards this, and should be taken into consideration in the treatment of patients who have previously undergone total colectomy. Colectomy or colonic exclusion may reduce or abolish the neuropsychiatric manifestations of chronic liver failure.

1648 ASPIRIN-INDUCED OCCULT GASTROINTESTINAL BLOOD LOSS: LOCAL VERSUS SYSTEMIC EFFECTS. (E.) Leonards, J. R. (Case-Western Reserve U. Sch. Med., Cleveland, Ohio) and G. Lev *J. Pharm. Sci.* 59(10):1511-1513, 1970.

Studies performed on 9 normal, healthy persons, determined that p.o. administration of aspirin (as sodium acetylsalicylate; 3.9-5.2 g for 8 days) produced local gastrointestinal bleeding, while injection of aspirin (2.7-3.4 g, i.v. in saline for 3 days) caused no gastrointestinal blood loss. In both cases, however, bleeding times were prolonged to a similar degree, indicat that changes in bleeding characteristics are not related to the local effect of aspirin on the stomach or intestinal mucosa. These results are considered important in terms of damage due to large therapeutic doses of aspirin, as in cases of rheumatoid arthritis; development of suitable preparations, with high aspirin content and a buffering capacity, are recommended.

1649 THE CONTROL OF GASTROINTESTINAL HEMORRHAGE BY SELECTIVE MESENTERIC ARTERIAL INFUSION OF VASOPRESSIN. (E.) Baum, S (U. Pennsylvania Grad. Hosp., Philadelphia) and M. Nusbaum. *Radiology* 98(3):497-505, 1971.

Bleeding was controlled by selective superior mesenteric arterial infusion of vasopressin in all but 1 of 28 patients with variceal hemorrhag associated with portal hypertension. Of 27 patients who were controlled, 24 underwent successful portasystemic shunting. Selective superior mesenteric arterial infusion of vasopressin during portasystemic shunt surgery resulted in a significant collapse of the collateral pathways, facilitating surgical exposure and dissection, and decreasing operativ time and blood loss. Arterial bleeding was promptly controlled in 6 patients with massive gastrointestinal hemorrhages caused by Mallory-Weiss syndrome (2 cases), hemorrhagic gastritis (2 cases), benign gastric ulcer (1 case), and colonic stress ulcer (1 case). These patients had undergone selective mesenteric arteriography which successfully demonstrated the site of hemorrhage. The 5 patients with gastric disorders required selective infusion of the left gastric artery with vasopressin for control of bleeding. The use of superior mesenteric arter vasopressin infusions during elective portasystemic shunt surgery apparently is more effective in decreasing surgical blood loss than hypotensive anesthesia or generalized hypothermia.

1650 THE USE OF SYSTEMIC HYPOTHERMIA IN THE CONTROL OF MASSIVE GASTROINTESTINAL HEMORRHAGE. (E.) Katz, S. (St. Luke's Hosp. Ctr., New York, N. Y.), L. O. Holgersen, R. E. Miller and J. P. West. *Am. J. Surg.* 120(6): 740-742, 1970.

Systemic hypothermia was used to treat 12 patients with otherwise uncontrollable massive hemorrhage of the stomach, small intestine, or colon. All patients had a nasogastric tube in place, and hypothermia was achieved using paired encircling hypothermia blankets after the i.v. administration of chlorpromazine and barbiturates to prevent shivering. Using a rectal thermocouple for monitoring, the temperature was lowered to about 30-32C over a 4-hr period. During hypothermia, the administration of i.v. fluids was reduced by 50%. Hypothermia was maintained for at least 24 hr after active bleeding had stopped, and the patients were permitted to return to normothermia by passive rewarming. Adequate hypothermia was usually achieved in 3-8 hr, but 3 patients required 12, 22, and 36 hr. Hypothermia either controlled the bleeding within 1-3 hr after attaining adequate therapeutic levels, or was not effective at all. Of those who responded, 7 received 24-36 hr of hypothermia, and 1 received treatment for 56 hr. Control of hemorrhage was seen in all 7 patients with postoperative stress ulcers, in 1 patient with gastric ulcer and cirrhosis, and in 1 patient with diverticulosis after left total colectomy; failure was seen in 1 patient with carcinomatosis and steroid-induced stress ulcer who subsequently died, 1 with a chronic duodenal ulcer who later responded to surgery, and 1 with acute nonspecific colitis and cirrhosis who also died. In addition, 2 of those with postoperative stress ulcers who stopped bleeding after hypothermia, died later. Complications included arrhythmias in 7 (including 5 cases of atrial or ventricular premature beats which disappeared either spontaneously or, after rewarming, to lidocaine; 1 with arteriosclerotic heart disease who developed idioventricular rhythm and arrest; and 1 who survived an infarction after arrest), pneumonitis in 2, and severe paralytic ileus in 2 patients.

1651 SERUM INSULIN RESPONSE TO ORAL GLUCOSE IN PERNICIOUS ANEMIA. (E.) Rehfeld, J. F. (Bispebjerg Hosp., Copenhagen, Denmark) and E. Hippe. *Scand. J. Gastroenterol.* 5(8):713-718, 1970.

Serum insulin and blood glucose levels were determined after glucose was administered p.o. (100 g) and i.v. (25 g) to 8 patients, aged 41-76 yr, with pernicious anemia and to 11 controls, aged 41-90 yr, without known gastrointestinal disorders or a family history of diabetes. None of the subjects had diabetes and all were of normal weight. To preclude differences in insulin levels being due to different blood glucose concentrations, an insulinogenic index was employed. It is defined as the ratio of the insulin to the glucose areas in blood glucose and serum insulin curves obtained within the first 60 min. In patients with pernicious anemia the average serum insulin values were significantly higher than in controls, and serum insulin values were higher after p.o. than after i.v. glucose loading. The insulinogenic index was significantly higher in patients with pernicious anemia than in controls. These findings suggest that increased insulin values in pernicious anemia result from abnormalities in the release of intestinal hormones which affect insulin release, rather than to an increased glucose absorption rate or to general or delayed hyperinsulinism.

1652 THE LIVER IN SICKLE CELL ANEMIA. A CLINICAL-PATHOLOGIC STUDY. (E.) Rosenblate, H. J. (Presbyterian-St. Luke's Hosp., Chicago, Ill.), R. Eisenstein and A. W. Holmes. *Arch. Pathol.* 90(3):235-245, 1970.

Clinical symptoms were compared with the results of liver function tests and histological changes in percutaneous needle biopsies from the livers of 12 patients, aged 7-31 yr, with sickle cell anemia. Biopsies from all 12 patients, including 8 with no signs of liver disease, showed widely dilated and congested liver sinusoids, erythrophagocytosis by Kupffer cells, and parenchymal atrophy most pronounced in the central zones. Liver cell changes were similar in many ways to those observed in experimental hypoxia, and are attributed to interference with liver cell nutrition by sinusoidal aggregates of sickled RBC, fibrin, and platelets and by occasional basement membranes in the Disse's spaces. None of the biopsies, including those from 4 patients with clinical symptoms identical to those of viral hepatitis, showed any of the characteristics of viral hepatitis. Serum bilirubin values were elevated in all patients. This may be due to interference with the uptake of bilirubin by the liver cells. Serum alkaline phosphatase activity was moderately elevated in all but 2 patients; serum leucine aminopeptidase levels were abnormal in only 3 patients during crisis; and SGOT, serum isocitrate dehydrogenase, and serum LDH were elevated in most patients. Except for moderate increases in the γ-globulin fraction in 2 cases and an increased albumin level in 1 case, serum protein levels were normal.

1653 RADIOIMMUNOASSAY OF PLASMA-GASTRIN IN PERNICIOUS ANAEMIA, ACHLORHYDRIA WITHOUT PERNICIOUS ANAEMIA, HYPOCHLORHYDRIA, AND IN CONTROLS. (E.) Ganguli, P. C., D. R. Cullen and W. J. Irvine (Roy. Infirm, Edinburgh, Scotland). *Lancet* 1(7691):155-158, 1971.

Fasting plasma gastrin levels were significantly increased in 75% of 95 patients with pernicious anemia, achlorhydria with adequate vitamin B_{12} absorption, or hypochlorhydria. No significant differences were found between these 3 groups. In control patients without gastrointestinal or endocrine disease, fasting plasma gastrin levels rose with age; however, controls whose sera did not contain gastric antibodies revealed no change. The exponential fall in the plasma gastrin level, in 2 pernicious anemia patients, started almost immediately following hydrochloric acid administration. Increased plasma gastrin levels were also seen in 9 patients with Zollinger-Ellison syndrome, and may be of use in its diagnosis. It also may be of value in the study of the natural history of atrophic gastritis and may reflect the gastric histology, particularly with reference to hormone secreting cells.

1654 FURTHER STUDIES ON THE NATURE OF IMMUNOREACTIVE GASTRIN IN HUMAN PLASMA. (E.) Yalow, R. S. (VA Hosp., Bronx, N. Y.) and S. A. Berson. *Gastroenterology* 60(2):203-214, 1971.

Two components were separated by electrophoretic and filtration analysis of immunoreactive plasma gastrin from the blood of patients with Zollinger-Ellison syndrome or pernicious anemia in the fasting or postfeeding state. One component had the characteristics of Gregory-Tracy heptadecapeptide gastrin; the other component had a less acidic charge than heptadecapeptide gastrin but emerged from a Sephadex gel column in a zone consistent with a molecular weight of 7000 (3½ times the molecular weight of heptadecapeptide gastrin). The larger, more basic component usually represented the major fraction of plasma gastrin; the heptadecapeptide-like component was present only in traces in some samples. However, the contribution of heptadecapeptide-like gastrin may range up to 50% of the total immunoreactive gastrin, especially after feeding. There appears to be no quick spontaneous interconversion between the 2 components in vitro, nor does incubation or fractionation in 8 M urea buffers alter the distribution between the components. This finding and the ability of trypsin to convert the larger component into an immunoreactive component similar to heptadecapeptide gastrin indicates that this component may be a complex of heptadecapeptide gastrin covalently linked with a more basic peptide. The separated plasma components are indistinguishable from each other and from heptadecapeptide porcine gastrin I in their immunochemical reaction with guinea pig antiporcine gastrin I antibodies.

1655 STEROID SULPHATES IN PLASMA FROM PREGNANT WOMEN WITH PRURITUS AND ELEVATED PLASMA BILE ACID LEVELS. (E.) Sjövall, J. (Karolinska Inst., Stockholm, Sweden) and K. Sjövall. *Ann. Clin. Res.* 2(4):321-338, 1970.

Changes in the steroid sulfate pattern in plasma were studied in 17 pregnant women with typical pruritis and elevated plasma bile acid levels using gas chromatography-mass spectometry. Six steroids, not found in plasma from healthy pregnant women, were identified: 5α-androstane-3α,17α (and 17β)-diols, 3ξ-hydroxy-5ξ-pregn-16-en-20-one, 3α-hydroxy-5α,17α-pregnan-20-one, 3α, 16α-dihydroxy 5α-pregnan-20-one, and 5α-pregnane-3α,16α,20α-triol. The main changes in these women were increased concentrations of C_{21} steroids with a 3α, 5α and 3α, 5β configuration, a relative increase of 20α-hydroxysteroids, and a relative decrease of C_{21} steroids with 3β, 5α configuration. Total steroid sulfate concentration exceeded 2 mg/100 ml plasma in many patients. The changes in plasma steroid sulfate concentrations in pruritis of pregnancy may be due to impaired biliary elimination and a changed formation of $C_{21}O_2$ and $C_{21}O_3$ steroid metabolites.

1656 DEFECTIVE INTESTINAL PHOSPHATE ABSORPTION IN FAMILIAL AND NON-FAMILIAL HYPOPHOSPHATAEMIA. (E.) Condon, J. R. (St. George's Hosp., London), J. R. Nassim and A. Rutter. *Br. Med. J.* 3(5715):138-141, 1970.

All patients with familial and nonfamilial hypophosphatemia not being treated with vitamin D had flat oral phosphate tolerance curves compared to controls. Patients treated with vitamin D had phosphate tolerance curves which lay midway between those of controls and untreated patients. Although a renal phosphate leak was present in all hypophosphatemia patients studied, urine phosphate was higher in controls, indicating that a renal leak cannot account for the flat phosphate tolerance curves. In 3 hypophosphatemic patients with normal phosphate tolerance tests, but with defective renal tubular reabsorption of phosphate, normal plasma phosphate levels were attained when oral phosphate supplements were given. Therefore, even with a renal leak, normal plasma phosphate can be maintained if intestinal phosphate absorption is normal. Possibly, defective intestinal absorption of phosphate plays a major part in the etiology of rickets and osteomalacia in familial and nonfamilial hypophosphatemia.

1657 LIPID TRANSPORT IN KWASHIORKOR. (E.) Flores, H. (U. Chile Sch. Med., Santiago), N. Pak, A. Maccioni and F. Monckeberg. *Br. J. Nutr.* 24(4):1005-1011, 1970.

A comparison was made of some parameters of lipid metabolism in 10 patients with kwashiorkor, aged 12-27 months, and in 9 patients with marasmus, aged 4-14 months. On admission plasma lipid levels, particularly triglyceride levels, were very low in kwashiorkor patients, but they increased markedly very soon after treatment was begun. This increase occurred primarily in very low-density (less than 1.063) serum lipoproteins, and was accompanied by a pronounced increase in serum protein concentrations. Histochemical examination of liver biopsies, taken before day 5 of treatment, confirmed the presence of fatty liver in patients with kwashiorkor and its absence in those with marasmus. Chemical analyses of liver samples showed that lipids accounted for an average of 25% of the wet weight in patients with kwashiorkor, but these lipids decreased significantly after 8-12 days of treatment. Fatty liver in malnourished children was related to low plasma β-globulin values. No abnormalities were found in any of the lipid parameters in children with marasmus. These findings suggest that fatty infiltration of the liver in kwashiorkor is due to an impairment in the synthesis of very low-density lipoprotein, probably due to rate-limiting synthesis of its protein moiety.

1658 EFFECT OF GLYCINE AND GLUCOSE ON SODIUM AND WATER ABSORPTION IN PATIENTS WITH CHOLERA. (E.) Nalin, D. R. (Pakistan-SEATO Cholera Res. Lab., Dacca, East Pakistan), R. A. Cash, M. Rahman and M. Yunus. *Gut* 11(9):768-772, 1970.

After receiving i.v. therapy for shock, severely dehydrated cholera patients were treated by p.o. or intragastric administration of electrolyte solutions or electrolyte solutions containing glycine, glucose, or both glycine and glucose. Solutions containing glycine, glucose, or a combination of the 2 were absorbed in sufficient quantity to maintain fluid and electrolyte balance. Glycine absorption was manifested by sharp increases in serum urea nitrogen, maintainence of normal serum and urinary creatinine levels, and decreased plasma specific gravity. During the first 8 hr after institution of therapy, net intestinal absorption was greatest in the group given both glucose and glycine. The mean duration of diarrhea was significantly shorter and the diarrhea volume was significantly lower in this group than in patients given electrolytes alone or electrolyte solutions with glucose or glycine alone.

1659 MONOSACCHARIDE INTOLERANCE AND HYPOGLYCEMIA IN INFANTS WITH DIARRHEA. I. CLINICAL COURSE OF 23 INFANTS. (E.) Lifshitz, F. (U. Maryland Hosp., Baltimore), P. Coello-Ramírez and G. Gutiérrez-Topete. *J. Pediatr.* 77(4):595-603, 1970.

Of 403 infants hospitalized with diarrhea, 23 (14 boys and 9 girls, aged 11 days to 10 months) had persistent diarrhea and intolerance to all carbohydrates. Marasmus was present in 18 cases and kwashiorkor in 3. Patients who were given milk had lactose intolerance during the acute stages of diarrhea. Feces were liquid, had acid pH values, and contained carbohydrates even when milk was replaced with sucrose and/or glucose. Diarrhea improved when all carbohydrates were eliminated from the diet; but, then hypoglycemia developed in 17 cases which, in 2 cases, did not even respond to i.v. infusions of 3.3% glucose. Intolerance to p.o. loads of monosaccharides was demonstrated in 21 patients during the first 15 days free of diarrhea. Monosaccharide intolerance, lasting a few days to several weeks, was transient in most cases, but 9 patients died before they were able to tolerate carbohydrates. The ability to tolerate monosaccharides was often correlated with the presence of bacteria in the duodenal fluid; in 12 cases the organisms isolated were not enteropathogenic. Hypoglycemia was considered to be the cause of death in 3 cases. Other complications included pneumatosis intestinalis (8 cases), severe antibiotic-resistant infections (5 cases), and a massive hemorrhage of undetermined origin (1 case). Diarrhea in these infants may be due to the osmotic effect and intestinal irritation, and increased motility may be produced by intact carbohydrate and products of bacterial degradation.

1660 MONOSACCHARIDE INTOLERANCE AND HYPOGLYCEMIA IN INFANTS WITH DIARRHEA. II. METABOLIC STUDIES IN 23 INFANTS. (E.) Lifshitz, F. (U. Maryland Hosp., Baltimore), P. Coello-Ramírez and G. Gutiérrez-Topete. *J. Pediatr.* 77(4):604-612, 1970.

Blood glucose levels were determined in 23 infants with persistent diarrhea and intolerance to all carbohydrates. When they were treated with carbohydrate-free diets, 17 of the 23 developed hypoglycemia. During the acute stage of diarrhea hypoglycemia developed between feedings given at 4-hr intervals, even when glucose was administered p.o. After the diarrhea improved and p.o. carbohydrate loads were tolerated, blood glucose levels returned to normal. Blood glucose levels depended upon the presence of diarrhea and carbohydrate intolerance and the dietary glucose intake. Blood glucose levels were not related to body weight, but liver glycogen stores probably were related since gradual falls in blood glucose occurred in 8 of 15 infants after p.o. loading with hyperglycemic agents (epinephrine and glucagon). Drops in blood glucose occurred in 5 hypoglycemic and 2 normoglycemic patients after p.o. loading with calcium caseinate; 3 of these infants also failed to respond to hyperglycemic stimulation with epinephrine. In these patients, i.v. glucose caused a progressive decrease in blood glucose levels until very low levels were reached. During the acute stage, urinary excretion of vanillylmandelic acid did not increase after induction of hypoglycemia with insulin, indicating that the adrenal medullary capacity was depleted. Treatment with ephedrine sulfate (5 mg p.o. 4 times a day) was beneficial to 4 patients who responded to epinephrine stimulation.

1661 SUGAR ABSORPTION AND INTESTINAL MOTILITY IN CHILDREN WHEN MALNOURISHED AND AFTER TREATMENT. (E.) James, W. P. T. (Cent. Middlesex Hosp., London). *Clin. Sci.* 39(2):305-318, 1970.

Carbohydrate absorption was determined by jejunal perfusion, and intestinal motility was measured simultaneously by a dye dilution technique in 10 Jamaican infants, aged 8-12 months, with protein-calorie malnutrition and diarrhea. The rate of sucrose and lactose hydrolysis in the jejunum correlated significantly with sucrase and lactase activities in jejunal biopsies. All 10 infants had reduced glucose absorption, 8 had reduced lactose absorption, and 6 had reduced sucrose hydrolysis and absorption. Carbohydrate absorption was slowest in infants with the most severe mucosal damage. Disaccharide malabsorption was due to impaired hydrolysis and not to malabsorption of the monosaccharide hydrolysis products. None of these abnormalities in carbohydrate absorption could be explained by iron or folic acid deficiencies. After treatment, increases occurred in glucose, lactose, and sucrose absorption. The generalized nature of malabsorption and its reversibility suggests that lactose intolerance in these infants is nutritional in origin, and is not due to a genetic predisposition to lactase deficiency. No evidence of hypermotility was found in malnourished infants because their intestines are smaller and less distensible than after treatment. While treated infants absorbed water from all 5 solutions infused, malnourished infants only absorbed water with the lowest glucose concentration and with the sucrose solution. The mean transit time of fluid passing down the intestine was inversely related to unabsorbed sugar remaining in the intestinal lumen.

1662 RECOVERY OF SMALL-INTESTINAL STRUCTURE AND FUNCTION AFTER RESIDENCE IN THE TROPICS. I. STUDIES IN PEACE CORPS VOLUNTEERS. (E.) Lindenbaum, J. (Harlem Hosp. Ctr., New York, N. Y.), C. D. Gerson and T. H. Kent. *Ann. Intern. Med.* 74(2):218-222, 1971.

When 41 Peace Corps volunteers who had served in India and Pakistan for 18-24 months were examined after they returned to the U.S., their clinical status and absorption functions were determined to see if there were any long-range effects on the small intestine as a result of living in the tropics. After their return, most volunteers ceased to have diarrhea and began to gain weight, although 10 continued to have episodes of diarrhea for months. Xylose and vitamin B_{12} absorption and jejunal biopsy studies showed significant improvement when compared to studies previously done on some subjects while in Pakistan. Symptomatic, functional, and morphological recovery indicate that the small intestinal disorders observed seem to be reversible within 1 or 2 yr, and had no permanent effects in most subjects.

1663 EFFECT OF DIETARY PROTEIN AND CERTAIN AMINO ACIDS (SULFUR-CONTAINING AMINO ACIDS AND VALINE) ON THE NUMBER AND MORPHOLOGY OF LYMPHOCYTES IN THE INTESTINAL MUCOSA. (Fr.) Cao, M. J. (CNRS Marcel Delepine Ctr., Orleans-La Source, France) and A. Aschkenasy. *C. R. Soc. Biol. (Paris)* 164(2):277-281, 1970.

Experiments performed on 42 male Sherman rats indicate that diets deficient in amino acids apparently decrease protein synthesis in intestinal lymphocytes. Rats were divided into 6 groups and given diets containing: (1) 18% casein, (2) 18% of a mixture of 19 amino acids, (3) L-glutamic acid in place of methionine and cystine, (4) L-glutamic acid in place of valine, (5) no amino nitrogen at all, or (6) no amino nitrogen for 46 days followed by 18% casein for 1 week. In all rats fed deficient diets; the volume of Peyer's patches was reduced or nil, particularly in valine-deficient rats. In the terminal ileum, the lymphocyte count increased in most rats fed deficient diets due to intestina retraction with a decrease in intercellular space Amino-acid deficient diets reduced the number of basophilic lymphocytes, particularly plasmocyt and large nonbasophilic lymphocytes while increasing the number of small lymphocytes devoid of cytoplasm. These changes were more pronounced among valine-deficient rats than among those on diets containing no methionine and cystine and those on diets containing no amino nitrogen at all. Valine-deficient rats also had significantl fewer blood lymphocytes, lower thymus weights, and fewer eosinophils in the intestinal villi than rats on diets with no sulfur-containing amino acids or no amino nitrogen. These findings suggest that morphological changes in intestinal lymphocytes induced by amino acid deficiencies may be due in part to an immunological mechanism. In rats in group (6), the morphology of intestina lymphocytes returned to normal 1 week after casein was restored to the diet, but the weight of their lymphoid organs was far below that found in the controls.

1664 EFFECT OF THIAMINE DEFICIENCY ON INTESTINAL ABSORPTION OF ESSENTIAL AMINO ACIDS. (Fr.) Wellers, G. (Sch. Med., Par N. Galent and J. Chevan. *C. R. Soc. Biol. (Pari* 164(4):742-745, 1970.

Vitamin B_1 deficiency in albino Wistar rats reduced intestinal amino acid absorption. This reduction was highly significant for isoleucine; somewhat less pronounced for histidine, phenylalanine, threonine, and tryptophan; definitely less marked for leucine, lysine, and valine; and still significant for methionine, but methionine absorption was not significantly decreased. Vitamin B_1 deficiency had less effect on amino acid pools in the intestine and blood. Deficien rats had reduced intestinal arginine and tryptophan contents, increased intestinal isoleucine and valine contents, reduced blood tryptophan levels, and increased blood histidine and valine levels. These findings suggest that the amino acid imbalance found in vitamin B_1-deficient rats plays a role in nitrogen metabolism disorders and anorexia which are observed in these animals.

1665 FATTY ACID PATTERNS DETERMINED SIMULTANEOUSLY ON HUMAN ADIPOSE TISSUE, LIVER, AND PLASMA DURING STARVATION. (E.) Laurell, S. (Univ. Hosp., Lund, Sweden) and A. Lundquist. *Scand. J. Clin. Lab. Invest.* 27(1): 29-32, 1971.

Changes in the fatty acid composition during fat transport were generally less conspicuous than those reported for subjects after a short period of fasting. The level of linoleic acid tended to rise successively during its passage through the transport system, probably because it is oxidized less and recycled more as free fatty acid than are palmitic and oleic acid. A surprising finding was the dissimilarity between liver and plasma triglycerides, probably because some chylomicrons were formed in the intestine from bile lecithin and plasma free fatty acids even during complete starvation. The fatty acid composition was more similar to that of adipose tissue in the starved subjects.

1666 ELECTRON MICROSCOPE FINDINGS IN THE JEJUNAL MUCOSA OF PATIENTS WITH PSORIASIS. (E.) Themann, H. (Westphalian Wilhelms U. Inst. Med. Phys., Munster, Germany), F. E. Preston, D. M. Roberts and F.-J. Knust. *Arch. Klin. Exp. Dermatol.* 238(4):323-332, 1970.

Jejunal biopsies from 10 patients (8 males and 2 females, aged 14-32 yr) with psoriasis and no clinical signs of gastrointestinal disease were studied for disacharidase activity and structural and ultrastructural changes. With light microscopy no abnormalities were found in jejunal mucosa from 6 of the 10 patients. The remaining 4 had partial villous atrophy with blunting and broadening of the villi and, in 1 case, mucosal thickening. Electron micrographs were abnormal in all 10 cases. In biopsies which appeared normal with light microscopy, abnormalities included an increased number of lysosomes, bubble-shaped distensions in the endoplasmic reticulum, myelin figures, and signs of severe epithelial degeneration. In biopsies which were abnormal on light microscopy, ultrastructural abnormalities were more severe and included extensive vacuolization of the endoplasmic reticulum, distension and amputation of microvilli in the brush border, double membrane-bound inclusion bodies in the cytoplasm of epithelial cells and, in 2 cases, total degeneration of epithelial cells and lymphocytic infiltration of the epithelium. One patient with no abnormalities on light microscopy had severe ultrastructural changes. Although disaccharidase activity was decreased in 6 cases, there was no apparent correlation between sucrase and lactase activities and the severity of ultrastructural changes, or between the duration and severity of the psoriasis and morphological and enzymatic changes in the intestine. Although the intestinal abnormalities found in this study are probably specific for psoriasis, their cause remains unknown.

1667 SMALL BOWEL FINDINGS AND GLUTEIN-FREE DIET IN DERMATITIS HERPETIFORMIS. A PRELIMINARY REPORT. (E.) Blomqvist, K. (U. Helsinki Dept. Dermatol., Finland), J. Jussila and S. Tarpila. *Arch. Belg. Dermatol. Syphiligr.* 26(2):171-178, 1970.

Small bowel abnormalities were recorded during examinations of 30 of 44 patients with dermatitis herpetiformis. Changes included lymphocytic and plasma cell infiltration into the lamina propria without villous changes, partial, subtotal or total villous atrophy, and extensive vacuolization of the epithelial intercellular spaces. The d-xylose tolerance test was pathological in 12 of 44 cases and fecal fat excretion increased in 8 of 19 cases. There was no correlation between morphological or functional findings and the severity of the skin manifestations. In 4 of 8 histologically normal specimens, low lactose activity and a low lactase to sucrase ratio were observed. Histological and electron microscopic changes and lactase deficiency of the small bowel were usually normalized by a gluten-free diet. A tendency for decreased need of medication and amelioration of the skin manifestation was also observed. The prevalence rate of selective lactase deficiency in patients with dermatitis herpetiformis and normal morphology of the small bowel is apparently higher than in the general population.

1668 PANCREATIC FUNCTION AND INTESTINAL ABSORPTION IN CHRONIC ALCOHOLISM. (E.) Mezey, E. (Baltimore City Hosps., Md.), E. Jow, R. E. Slavin and F. Tobon. *Gastroenterology* 59(5):657-664, 1970.

Of 37 male chronic alcoholics, aged 25-57 yr (mean age 40 yr), with no clinical evidence of chronic liver disease, 13 had steatorrhea and 9 had abnormal D-xylose absorption although jejunal biopsies were normal in all cases. Pancreatic function was impaired in 14 patients as seen from low volumes of duodenal aspirate, low bicarbonate concentrations, and low amylase activities after secretin stimulation. Pancreatic calcification was present in 2 of these 14 patients. Follow-up studies, performed on 18 patients, revealed that most of these abnormalities disappeared when an adequate diet was instituted with or without continuation of alcohol. Alcohol had no deleterious effect when given with a normal diet. These findings provide evidence that subclinical protein malnutrition is one of the underlying causes of malabsorption in patients with chronic alcoholism.

1669 CHANGES IN INTESTINAL ABSORPTION OF GLUCOSE IN RATS TREATED WITH ETHANOL.

(E.) Ghirardi, P. (Simes Co. Biochem. Lab., Milan, Italy), A. Marzo, D. Sardini and G. Marchetti. *Experientia* 27(1):61-62, 1971.

Sprague-Dawley rats received 4 g/kg/day of a 40% solution of ethanol by nasogastric intubation for 2, 7, or 20 days. Rats were then fasted for 5 hr and the duodenum and ileum were isolated in vivo and injected with glucose. After 1 hr, in the rats receiving ethanol for 2 or 7 days, intestinal absorption of glucose had decreased by about 18%, while there was no change in rats receiving ethanol for 20 days. Compared to controls, rats receiving ethanol for 2, 7 or 20 days showed increases in blood glucose levels of 21%, 32%, and 17%, resp. The variation in liver glycogen among the groups was not significant. It is concluded that the changes observed in intestinal absorption of glucose can be attributed to acute, rather than chronic, effects of alcoholic intoxication.

1670 THE ABSORPTION OF α-TOCOPHEROL IN MAN.

(E.) Kelleher, J. (St. James's Hosp., Leeds, England) and M. S. Losowsky. *Br. J. Nutr.* 24(4):1033-1047, 1970.

DL[5-Me ^{3}H]α-Tocopherol (2 mg or less) was administered p.o. to 50 fasting subjects with various diseases, with and without steatorrhea, and net absorption was determined by measuring unabsorbed fecal radioactivity. All subjects excreted more than 70% of unchanged α-tocopherol. α-Tocopherol absorption was significantly lower in subjects with steatorrhea (mean 59.4%) than in those without steatorrhea (mean 72.4%). Less than 65% of the α-tocopherol dose was absorbed by 19 of the 24 subjects with steatorrhea and more than 65% was absorbed by 22 of the 26 subjects without steatorrhea. α-Tocopherol absorption was significantly correlated with the severity of the steatorrhea. In most of the diseases investigated steatorrhea appeared to be associated with a decrease in α-tocopherol absorption. However, α-tocopherol absorption was reduced in all 4 postgastrectomy patients who did not have steatorrhea. This may explain the high incidence of vitamin E deficiency in such patients. Plasma radioactivity reached a maximum 6-12 hr after administration of the vitamin. Plasma radioactivity curves were significantly lower in patients with steatorrhea than in those without it, but there was considerable overlap. In some patients with severe vitamin E deficiency and severe steatorrhea there was no detectable plasma radioactivity even when as much as 40% of the administered dose was absorbed. Decreased plasma radioactivity was also found in 3 patients with severe vitamin E deficiency but no steatorrhea. Urinary excretion of α-tocopherol was almost always less than 6% of the administered dose.

1671 BIOSYNTHESIS OF A FUCOSE-CONTAINING GLYCOPEPTIDE FROM RAT SMALL INTESTINE IN NORMAL AND VITAMIN A-DEFICIENT CONDITIONS.

(E.) De Luca, L. (Massachusetts Inst. Technol., Cambridge), M. Schumacher and G. Wolf. *J. Biol. Chem.* 245(17):4551-4558, 1970.

Vitamin A deficiency in rats had no effect on 1-^{14}C-glucosamine incorporation into total glycoprotein in intestinal mucosa, or on the synthesis of bulk glycoproteins in vivo on membrane-bound or free polyribosomes after pulse-labeling with glucosamine. However, when bulk glycopeptide was separated into its constituents by column chromatography, ^{14}C-glucosamine incorporation into the glycopeptide fraction eluted with 0.4 M LiCl was greatly reduced in deficient animals, while incorporation into the fraction eluted with 0.5 M LiCl was increased. These results suggest a precursor-product relation between these 2 glycopeptide fractions, with an accumulation of precursor when product synthesis is interrupted. Administration of vitamin A (500 μg retinyl acetate p.o. + 500 μg i.p. in Tween 80) restored glucosamine incorporation into both glycopeptide fractions to normal levels within 18 hr, and increased the number of goblet cells per crypt. This suggests that vitamin A stimulates the differentiation of the basal epithelium to produce new goblet cells, and the synthesis of new glycoprotein may result from the growth of new cells. Further fractionation of the peak eluted with 0.4 M LiCl gave 3 subfractions, of which only 1, a fucose-containing glycopeptide, was affected by vitamin A deficiency This glycopeptide contained glucosamine, galactose fucose, and sialic acid in the molar ratios of 3:3:1:0.25, resp. The ultracentrifugal behavior of the glycopeptide in water and phosphate buffer indicates that below pH 6 the glycopeptide has an elongated, rod-shaped configuration while at pH 7.5 it has a globular or hydrated structure that permits faster sedimentation and the separation of 2 components at 6.2 S and 7.2 S. In vitro rough endoplasmic reticulum prepared from vitamin A-deficient animals synthesized only 1/2 to 1/3 of the fucose-containing glycopeptide that was produced by rough endoplasmic reticulum from nondeficient rats.

1672 EFFECTS OF CHOLINE-DEFICIENT DIETS ON THE RAT HEPATOCYTE. ELECTRON MICROSCOPI OBSERVATIONS.

(E.) Bruni, C. (U. Virginia Sch. Med., Charlottesville) and D. M. Hegsted. *Am. J. Pathol.* 61(3):413-436, 1970.

A comparison was made of liver cell ultrastructure in male Sprague-Dawley rats fed choline-deficient diets (low in methionine and vitamin B$_{12}$) having fat contents of 4-15% and in rats fed a standard chow. The first abnormality, noted 12 hr after the beginning of treatment, consisted of an increase in membrane-free triglyceride droplets in the ground substance of the cytoplasm. This was later associated with structural changes in the lecithin-containing membranes of the rough endoplasmic reticulum and Golgi apparatus which lose their ability to transport lipoproteins into the plasma at a normal rate. Lipoproteins accumulate in the lumen of the membranous systems and, as a result of fusion, become larger than under normal conditions. However, no evidence was found that lipoprotein granules or any other lipid material normally segregated within the membranous systems of the cytoplasm become part of the pool of liver triglycerides. It is suggested that structural abnormalities in the membranous systems prevent increases in lipoprotein transport rates which are required by increased production of triglycerides, so that abnormally large quantities of the latter are diverted to the floating fat.

1673 EFFECT OF A COPPER-DEFICIENT DIET ON THE PANCREAS. LIGHT MICROSCOPE STUDY OF THE EXOCRINE PANCREAS IN ALBINO RATS. (Ger.) Müller, H. B. (Philipps U. Anat. Inst., Marburg a. d. Lahn, Germany). *Virchows Arch.* [*Pathol. Anat.*] 350(4):353-367, 1970.

Weanling Wistar rats given a copper-deficient diet (condensed cow's milk) for 1-10 weeks weighed less than the controls and developed changes in the hair covering, as well as discolored incisors, mild exophthalmos, and unformed stools. After 7 weeks or more on the copper-deficient diet, severe atrophy of the pancreatic glands and lipomatosis were observed. Perhaps because of individual differences in the copper reserves of these animals at the beginning of the experiment, the severity of pancreatic atrophy was not closely related to the length of time the rats received the deficient diet. The acinar cells exhibited reduced basophilia, a decreased RNA content, a small number of zymogen granules, and pyknotic or destroyed nuclei. In addition to these atrophic changes, hypertrophic and degenerative changes were found in giant cells and giant nuclei. Because of cell destruction the normal acinar structure gradually became changed. Destroyed cells were replaced by connective tissue and fat cells, but no evidence of exudation or cellular infiltration was found. These morphological changes are probably due to disturbances in enzyme synthesis caused by copper deficiency.

1674 CHYLOUS ASCITES IN CHILDREN. (E.) Sanchez, R. E., G. H. Mahour (Child. Hosp. Los Angeles, Calif.), L. P. Brennan and M. M. Woolley. *Surgery* 69(2):183-192, 1971.

Case reports are presented for 7 children (5 boys and 2 girls, aged 9 hr to 6 yr) with chylous ascites. The total amount of milky fluid removed by paracentesis ranged from 40-30,000 ml. Congenital ascites was present in 2 cases and episodes of gastroenteritis preceded ascites in 3 cases. Radiological studies in 6 cases and laparotomy in 3 failed to reveal the cause of the ascites. One patient had retroperitoneal cystic lymphangiomatosis which failed to respond to surgery. Two patients were successfully treated with a low-fat, high-protein diet, and ascites did not recur. Long-term follow-ups revealed that 3 children had neurological abnormalities: electroencephalograms were abnormal in 2 cases, hyperkinesis was present in 1, and severe mental retardation was found in 2.

1675 POSTCOLECTOMY ILEITIS AND RELATED DISORDERS. (E.) Adson, M. A. (Mayo Clin., Rochester, Minn.), I. Benjamin and M. B. Dockerty. *Arch. Surg.* 102(4):326-331, 1971.

In a clinicopathologic study of ileitis developing after colectomy for nonspecific ulcerative disease of the colon, 9 cases of mucosal colitis (ulceration and inflammation confined to the mucosa) occurred only after colectomy and ileostomy for mucosal (nonspecific) colitis. Only granulomatous ileitis occurred subsequent to surgical treatment for granulomatous colitis. Apparently granulomatous ileitis is an idiopathic entity. Since mucosal ileitis was not seen after colectomy for granulomatous colitis, it suggests that mucosal ileitis also may be an idiopathic entity. Histopathologic differentiation between the mucosal ileitis which clinically appears to be idiopathic and the changes secondary to mechanical factors is not possible; therefore, whether ileitis was the cause or the result of obstruction in 1 patient with mucosal ileitis with partial stomal stenosis was not known. Stomal dysfunction months or yr after establishment of a stoma appears to be a common phenomenon, and subtle obstructive mechanisms may at times cause prestomal mucosal ileitis. The uncertainty concerning the primary *versus* secondary nature of mucosal ileitis justifies conservative management. Ileum involved with granulomatous disease which does not respond to medical management must be resected. Also, when the cause of ileitis remains obscure at the time of operation, ileal resection is indicated for short segments of mucosal ileitis.

1676 SPONTANEOUS UMBILICAL FISTULA ON GRANULOMATOUS (CROHN'S) DISEASE OF THE BOWEL. (E.) Hiley, P. C., N. Cohen and D. H. Present (Mt. Sinai Hosp., New York, N. Y.). *Gastroenterology* 60(1):103-107, 1971.

Predominant symptoms in 4 patients were abdominal pain and development of a superficial abdominal mass (in 3 of 4 patients) with subsequent drainage through the umbilicus. In all patients, the drainage was purulent with a feculant odor, and culture demonstrated colonic bacteria. The anatomic site of disease and the presumed site of fistulization were the terminal ileum in 3 patients and the midtransverse colon in one. Internal fistulas were seen in 3 of 4 patients and, in 2 patients, a fistulous tract was noted to be directed towards the anterior abdominal wall. Two patients underwent surgery (bypass without resection); 1 patient was treated with antibiotics; and 1 patient stopped drainage spontaneously. The first 3 patients gradually improved. The pathogenesis of an umbilical fistula may be the formation of an abcess in the vicinity of the umbilicus secondary to extension of the inflammatory process from either the terminal ileum or the transverse colon. As the abcess increases in size, it may enter a persistent urachal remnant, and thereby found a path of lowered resistance through which to drain.

1677 CROHN'S DISEASE. A CLINICAL STUDY BASED ON 186 PATIENTS. (E.) Krause, U. (Univ. Hosp., Uppsala, Sweden), L. Bergman and B. J. Norlén. *Scand. J. Gastroenterol.* 6(1): 97-108, 1971.

Of 186 patients with Crohn's disease, about 90% underwent surgery during the 12-yr period of observation. The recurrence rate after resection was 39%. Poor results were obtained following the bypass technique; 7 of 9 patients needed reoperation. With radical resections in which there was a macroscopically-free resectional margin of at least 10 cm on the ileal and colonic sides, the recurrence rate was less (19%) than that for nonradical resections (68%). Recurrences with reoperation were followed by a further recurrence rate of 43%. The total mortality in the whole series was 5.4%. With the relatively active attitude to surgery as regards treatment of recurrent lesions, 88% of all patients in the initial series are currently doing full time work, and 77% have little or no symptoms. Patients with recurrent lesions after surgery were treated with corticosteroids and salicylazosulfapyridine.

1678 AN UNUSUAL CASE OF ISCHEMIC ENTERITIS MIMICKING REGIONAL ENTERITIS. (E.) Fagin, R. R., F. H. Straus, E. April and J. B. Kirsner (U. Chicago Pritzker Sch. Med., Ill.). *Gastroenterology* 59(6):917-920, 1971.

Initial symptoms of bloody diarrhea alternating with constipation were a prelude to episodes of diffuse abdominal pain in a 40-yr-old woman in whom a diagnosis of regional ileitis was made. After hospitalization following increasing obstructive symptoms and recurrent rectal bleeding, the small intestine appeared normal and carcinoma of the colon was demonstrated on barium enema. This case appears to illustrate an ischemic enteritis which had spontaneously recovered over a 6 month period. Thumb printing, a result of submucosal hemorrhages, is a characteristic mucosal abnormality of ischemic bowel disease. The submucosa demonstrated moderate fibrosis, and the muscularis propria and serosa were least affected. The mechanism possibly involved slow occlusion of the afferent arteries by the tumor while collateral circulation developed simultaneously. The phenomenon of pronounced reversibili of an abnormal mucosal pattern may suggest the existence of ischemic enteritis in patients with a small intestinal pattern originally suggesting regional enteritis.

1679 DISTURBANCE OF THE JEJUNAL AND COLONIC BACTERIAL FLORA IN IMMUNOGLOBULIN DEFICIENCIES. (E.) Hersh, T., M. H. Floch (Yale U. Sch. Med., New Haven, Conn.), H. J. Binder, H. O. Conn, R. Prizont and H. M. Spiro. *Am. J. Clin. Nutr.* 23(12):1595-1601, 1970.

Quantitative and qualitative aerobic and anaerobic cultures of intestinal secretions and stools, and absorption studies were done on 12 patients with serum immunoglobin deficiency, and the findings were correlated with their clinical status. Jejunal and fecal flora of some subjects exhibited marked abnormalities, but these changes could not be correlated with clinical symptoms or laboratory studies. Jejunal overgrowth was observed in 85% of the subjects. Bacteroides was recovered in fewer than 50% of the subjects, significantly fewer than the normal population. All of the patients had low immunoglobin A serum levels, 6 had low immunoglobin G, and 9 had low immunoglobin M. The abnormalities in flora may be related to the immunoglobin deficiencies.

1680 JEJUNAL BACTERIAL FLORA IN CHRONIC SMALL BOWEL DISEASE. I. CELIAC DISEASE. II. REGIONAL ENTERITIS. (E.) Prizont, R., T. Hersh and M. H. Floch (Yale U. Sch. Med., New Haven, Conn.). *Am. J. Clin. Nutr.* 23(12):1602-16 1970.

Three of 6 patients with celiac disease had high total bacterial recoveries and high counts (greater than 10^3) of colon-type bacteria. All 3 had significant overgrowth of coliforms. Anaerobic bacteroides and lactobacilli were found in 2 cases, and Streptococcus salivarius in 2 cases. Increased total bacteria counts were found in 3 of 6 patients with regional enteritis; 2 subjects had colon-type bacteria, either coliforms or anaerobic bacteroides and lactobacilli. It appears that low gastric acidity, immunoglobulin deficiency, and motility abnormalities may play some role in the pathogenesis of bacterial overgrowth in these patients, although the data permitted no clear correlation. The bacterial overgrowth may contribute to disturbances in absorptive mechanis since some celiac patients, with a poor therapeutic response to a gluten-free diet, improved with antibacterial agents.

1681 TRANSMISSION OF ACUTE INFECTIOUS NONBACTERIAL GASTROENTERITIS TO VOLUNTEERS BY ORAL ADMINISTRATION OF STOOL FILTRATES. (E.) Dolin, R. (Natl. Inst. Allergy Infect. Dis., Bethesda, Md.), N. R. Blacklow, H. DuPont, S. Formal, R. F. Buscho, J. A. Kasel, R. P. Chames, R. Hornick and R. M. Chanock. *J. Infect. Dis.* 123(3):307-312, 1971.

Acute gastroenteritis was induced in 2 of 3 volunteers by the oral administration of a bacteria-free stool filtrate derived from a patient with naturally occurring acute infectious, nonbacterial gastroenteritis. Subsequently, a stool filtrate from one of the sick volunteers induced gastroenteritis in 7 of 9 additional men. The original rectal swab specimen from the naturally occurring case was passed 3 times in human fetal intestinal organ culture; and resultant material induced gastroenteritis in 1 of 4 volunteers. A spectrum of clinical responses developed, ranging from a predominantly diarrheal disease without vomiting to an illness characterized by repeated vomiting without accompanying diarrhea. The causative agent in acute nonbacterial gastroenteritis is apparently of an infectious nature since serial transmission was achieved through 2 groups of volunteers. In vitro replication of an infectious agent may have taken place, making it improbable that a nonreplicating substance, such as a toxin, served as the causative agent.

1682 THERMAL DAMAGE PRODUCED IN THE INTESTINAL SEROSA AND PERITONEUM OF RATS BY PERFUSING SALT SOLUTIONS THROUGH THE ABDOMEN AT DIFFERENT TEMPERATURES WITH SPECIAL CONSIDERATION OF ADHESION DEVELOPMENT. (Ger.) Schmauss, A. K. (Friedrichshain City Hosp., Berlin, Germany) and J. Berg. *Z. Exp. Chir.* 3(5):281-296, 1970.

The effects of peritoneal dialysis for 2 min with physiological saline at 50, 55, 60, and 65C were investigated in 120 female albino rats. The rats were divided into 4 groups, depending upon the temperature of the perfusion fluid. These groups were further subdivided into sham-operated controls (5 animals), animals killed and examined 24 hr after dialysis (15 animals), and animals examined after 21 days or after spontaneous death (10 animals). No gross or histological abnormalities were found in animals subjected to dialysis at 50C. Adhesions, peritonitis, and other signs of thermal damage were found in 37.5% of the rats dialyzed at 55C. Dialysis at 60C produced more severe adhesions, and other forms of thermal damage (peritonitis, necrosis, and ulcers) were found in 72%. Histological studies revealed the presence of bleeding, intestinal wall damage and, in some places, extensive destruction of the epithelium. Because of the short mean survival time (19.52 hr), the percentage of rats with adhesions was somewhat lower in animals dialyzed at 65C. All of these animals had gross evidence of severe thermal damage and histological evidence of bleeding and, in some places, destruction of the entire intestinal wall along with the mucosa. Considering the results of this study, saline solutions used in the operating room should not be warmer than 50C and their temperature should be accurately and continuously checked.

1683 THE OSTEOMALACIA SYNDROME AFTER STOMACH OPERATIONS. (E.) Morgan, D. B. (U. Leeds Gen. Infirm., England), G. Hunt and C. R. Paterson. *Q. J. Med.* 39(155):395-410, 1970.

The clinical features are described for 23 patients with the osteomalacia syndrome after stomach surgery. Patients with the more severe disease according to the amount of osteoid also had a lower serum phosphorus and a higher urinary hydroxyproline excretion. A comparison between the present patients and a similar group of 59 patients, from the literature revealed that differences between the 2 groups in the frequency of subjective signs (bone tenderness, excessive osteoclasis in the bone). All the patients described had either bone pains (100%), muscle weakness (54%), or both, and an excess of osteoid was a feature common to all patients whose bone was examined. Looser's zones were not an invariable (50%) feature of the syndrome, but their specificity justifies a complete search for them in a patient suspected of having the syndrome. The most frequent chemical abnormalities were a raised (greater than 17 King-Armstrong units) serum alkaline phosphatase (83%), a low (9.0 mg% or less) serum calcium (96%) and, in the present patients, a diminished tubular reabsorption of phosphorus (61%).

1684 GASTRO-INTESTINAL DISTURBANCES IN PATIENTS WITH SEVERE RHEUMATOID ARTHRITIS. (E.) Pettersson, T. (Univ. Cent. Hosp., Helsinki, Finland), O. Wegelius and B. Skrifvars. *Acta Med. Scand.* 188(1-2):139-144, 1970.

Tests for malabsorption and for liver and pancreatic function were made on 22 patients with severe rheumatoid arthritis and on 2 patients with active rheumatoid spondylitis. These patients consisted of 15 women and 9 men, aged 20-73 yr; all had received treatment with salicylates, phenylbutazone, indomethacin, corticosteroids, or radioactive gold. All patients had normal glucose-galactose tolerance curves, but lactose malabsorption was diagnosed in 6 cases on the basis of reduced lactase activities in biopsies of the small intestine; 2 of these patients reported milk intolerance. Although lactose malabsorption is relatively common in the general population, the normalization of lactose tolerance curves during remissions in 2 cases suggests that lactose malabsorption may be related to the active phase of arthritis. Intestinal amyloidosis was observed in 4 cases and renal amyloidosis in 1. The D-xylose tolerance test was abnormal in 7 and the vitamin A tolerance test in 9 patients. Blood folic acid levels were lowered in 5 cases and serum iron was low in 20. Some evidence of malabsorption was observed in 16 of these 24 patients. Abnormal results were obtained in 1 or more liver function tests (SGOT, SGPT, LDH isoenzymes, alkaline phosphatase, serum bilirubin, and BSP retention) in 5 of the 19 patients tested. Liver function normalized during remissions. Only 1 patient, who had not been given cortisone, had evidence of pancreatic insufficiency. Since evidence of gastrointestinal disturbances disappeared or were less pronounced during drug therapy, it is concluded that therapy can be excluded as a causative factor and that the disturbances are associated with arthritis.

1685 INTESTINAL PSEUDO-OBSTRUCTION IN SYSTEMIC AMYLOIDOSIS. (E.) Legge, D. A. (Mayo Clin., Rochester, Minn.), E. E. Wollaeger and H. C. Carlson. *Gut* 11(9):764-767, 1970.

Of 121 patients with systemic amyloidosis, 8 (6 men and 2 women, aged 46-70 yr) developed clinical symptoms of mechanical obstruction of the intestine, and 4 cases showed radiological signs of paralytic ileus. Unsuccessful surgery was performed in 3 cases because of an erroneous diagnosis of mechanical obstruction of the colon. Conservative treatment of acute pseudo-obstruction, employed in the remaining 5 cases, consisted of decompression with Miller-Abbott intubation, i.v. fluids, and daily enemas. These patients survived for 3 weeks to 3 months after acute symptoms subsided. Amyloid was found in the intestine at autopsy in 4 cases and in intestinal or gingival biopsies in 4 cases. Multiple myeloma was the predisposing disease in 4 cases and rheumatoid arthritis, in 2 cases.

1686 THE GASTROINTESTINAL TRACT IN OLD AGE. (Rev.) (Ger.) Kortge, P. (Free U. Berlin Steglitz Med. Clin., Germany) and H. F. Von Kress. *Internist (Berlin)* 11(7):255-260, 1970.

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1696 ABSCESS OF THE GREATER OMENTUM. (Rus. Lebedev, A. P. *Vestn. Khir.* 105(8): 117-118, 1970.

1697 ACCESSORY LUNGS WITH FOREGUT CONNEXION (E.) Gibson, A. A. M, (Yorkhill Child Hosp., Glasgow, Scotland). *Arch. Dis. Child.* 45(243):710, 1970.

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Mary's Hosp., London) and R. H. Johnson. *Br. J. Surg.* 57(9):690-697, 1970.

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Med. Ctr., Denver). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 110(2):340-342, 1970.

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n biopsies of 6 patients with coccidiosis (due o Isospora belli), the pathology of the small ntestinal mucosa varied: 2 patients had a flat ıucosa; 1 had tall villi with clubbed tips, ıarked dilatation of the vascular spaces, and xcessive collagen in the lamina propria; 1 had longated crypts with residual stubby villi; and he last 2 had residual broad villi with focal lattening of the mucosa. Lymphocytes, plasma ells and eosinophils were increased in the amina propria of all patients. All stages epresenting the endogenous development of occidia were observed either within the epithelium r immediately below it, often in vacuoles. dentification of any of the stages of human occidia in the small intestinal epithelium is onsidered diagnostic of coccidiosis which, lthough rare, may be responsible for many ndiagnosed diarrheal and malabsorption illnesses.

783 THE HISTOCHEMISTRY OF BILIARY MUCINS AND THE CHANGES CAUSED BY INFESTATION ITH Clonorchis sinensis. (E.) Chou, S.-T. ıd J. B. Gibson (Queen Mary Hosp. Compound, Hong ong). *J. Pathol.* 101(2):185-197, 1970.

istochemical reactions of the mucin-producing ells found at different levels in the bile ducts ıder normal conditions and after Clonorchis inensis infestation were studied in man (10 ecropsy cases of long-term clonorchiasis) and everal experimental animals. Supranuclear mucin as most prominent in primates. Goblet cells ere found in the ampulla of all species, while eep glands were observed in the interlobular and ‹trahepatic ducts of guinea pigs, but only in ıe extra hepatic ducts of other species. The iliary mucin consisted chiefly of carboxylated ıd sulfated acid mucins in proportions that aried with production site and species. Neutral ıcin was found largely in the goblet cells. onorchis sinensis infestation brought about an ıcrease in mucin-producing cells, an associated ıcrease in mucin production, and the formation deep glands and goblet cells at the sites of ıfestation.

'84 GIARDIASIS IN CHILDHOOD. ABSORPTION TESTS AND BIOCHEMISTRY, HISTOCHEMISTRY, GHT, AND ELECTRON MICROSCOPY OF JEJUNAL MUCOSA. .) Barbieri, D. (Clin. Hosp., Sao Paulo, 'azil), T. De Brito, S. Hoshino, O. B. Nascimento, V. Martins Campos, G. Quarentei and E. rcondes. *Arch. Dis. Child.* 45(242):466-472, 1970.

Results of absorption tests and examination of jejunal biopsies from 11 children, aged 1-8 yr, with asymptomatic infestation by Giardia lamblia suggest that the malabsorption which occurs in giardiasis depends upon blockage of the mucosa by the parasite, nutritional competition between host and parasite, and changes produced in the jejunal mucosa by the parasite. The lipiodol absorption test, which is a measure of fat absorption, was abnormal in 9 of these 11 patients before treatment and the D-xylose absorption test was abnormal in 3. After metronidazole therapy (two 10-day courses of 250-750 mg/day, depending upon age), the lipiodol absorption test remained abnormal in 3 cases, indicating that the parasite produced permanent damage in the small intestine. Treatment caused no change in the activities of acid phosphatases, alkaline phosphatases, or succinate dehydrogenase in the jejunal epithelium. Light microscopy revealed that the parasites had not invaded the jejunal mucosa and although the number and appearance of the villi were normal or almost normal, the lamina propria was usually infiltrated by histiocytes, lymphocytes, plasma cells, and eosinophils. Electron micrographs revealed that a large number of parasites had their adhesive disk directed toward the epithelial cells; some of the parasites adhered to the mucoid coat of the microvilli, but they never penetrated it. Ultrastructural changes included: (1) thickening of the mucoid coat of the microvilli, (2) branching microvilli with gaps between their bases, (3) an increased number of dense bodies, probably lysomes, in the cytoplasm, and (4) intercellular spaces in some areas infiltrated with inflammatory cells, mainly mononuclear ones.

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MARCH 1971
VOLUME 6, NO. 3
1801–2700

[illegible]

SEP 21 1971

Volume 6, No. 3 Abstracts and Citations Nos. 1801-2700

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the

National Institute of Arthritis and Metabolic Diseases

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *World Medical Periodicals*, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
µg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
µM	micromolar
mC,µC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
NAP	nicotanamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotide phosphate
NADPH	reduced nicotinamide adenine dinucleotide phosphate
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

1801 ENDOTHELIAL FENESTRAE IN INTESTINAL VILLI: DIFFERENCES BETWEEN THE ARTERIAL AND VENOUS ENDS OF THE CAPILLARIES. (E.) Casley-Smith, J. R. (U. Adelaide Dept. Zool., Australia). *Microvasc. Res.* 3(1):49-68, 1971.

Endothelial fenestrae in the capillaries of jejunal villi of mice were studied electron microscopically to determine any differences between the arterial and venous ends of the capillaries. The mean thickness of fenestra-bearing endothelium was slightly greater at the arterial than at the venous end. Venous ends of the capillaries had diameters and circumferences about twice those of arterial ends; such differences were accounted for principally by an 8-fold increase in the amount (length/cross-section) of thin endothelium. The number of fenestrae/μ in the thin portions of the endothelium were approximately 1.4 times greater at the venous ends, hence there were about 12 times as many fenestrae/capillary cross-section and 6 times as many per μ of circumference at the venous end. About ½ of the fenestrae at the arterial ends had diaphragms, compared with about 3/4 at the venous ends. The numbers and areas of fenestrae/μ^2 of capillary surface were 6-7 times greater at the venous end. The fenestrae seemingly assist in the removal of large particles from the tissue with bulk flow of fluid into the capillaries carrying proteins inward, while outward diffusion is prevented.

1802 THE PREPARATION OF BRUSH BORDERS FROM THE EPITHELIAL CELLS OF THE GUINEA-PIG SMALL INTESTINE BY ZONAL CENTRIFUGATION. (E.) Connock, M. J. (U. Birmingham Dept. Biochem., England), A. Elkin and W. F. R. Pover. *Histochem. J.* 3(1):11-22, 1971.

Electron microscopy of the brush border fraction of guinea pig small intestine confirmed biochemical analysis, and showed readily identifiable structures corresponding to the luminal margin of epithelial cells. The structure revealed a high degree of morphological integrity, but some blebbing of the individual microvilli was evident. The localization of esterase (one of the markers used for assessing subcellular organelles) indicates that the contaminating activity of the brush border fraction is probably bound to microsomes and, on sacrifice of the structural integrity of the brush borders, is largely separable from alkaline phosphatase. Acid phosphatase distribution was very similar to that of protein; this may indicate secondary binding of solubilized enzyme. Alternatively, there may be 2 components bearing activity, one either on the microsomes or on a similarly sedimenting structure, and the other on brush border derived structures. This latter activity, which corresponds to about 1% of the total activity of the epithelial cell, may well correspond to a small portion of alkaline phosphatase protein which remains active at an acid pH and is inhibited by fluoride. The zonal centrifugation method described is simple, reproducible, and relatively efficient for the isolation of brush border from epithelial cell material. From determinations of relative specific activity with respect to alkaline phosphatase, it was estimated that the brush border constitutes about 10-11% of epithelial cell protein.

1803 A NEW METHOD OF MEASURING THE RATE OF SHEDDING OF EPITHELIAL CELLS FROM THE INTESTINAL VILLUS OF THE RAT. (E.) Clarke, R. M. (U. Nottingham Dept. Human Morphol., University Park, England). *Gut* 11(12):1015-1019, 1970.

The turnover of epithelial cells from the intestinal villus of starved rats was studied by trapping shed epithelial cells in mucus secreted by goblet cells, and by counting the number of trapped cells per villus at 3 sites in the small intestine. The crypt:villus ratio was not significantly different from values for fed rats at any site observed. There was little difference in the cell production rate per crypt at different sites in the intestine as determined by number of colchicine-metaphases. The cell production rates/villus/hr were 204, 152, and 108 for increasing distances from the pylorus, while the cell-associated cell shedding rates/villus/hr were 214, 160, and 48, resp. As the duration of perfusion increased, signs of nuclear disintegration were observed. This process appeared to proceed more slowly in distal segments. Demecolcine had no effect on the rate of cell shedding; estimates of cell production and cell shedding showed good agreement in most cases.

1804 AN ULTRASTRUCTURAL STUDY OF INTESTINAL MITOCHONDRIAL MORPHOLOGY DURING THE ABSORPTION OF VARIOUS NUTRIENTS AND WATER IN SUCKLING RATS. (E.) González-Licea, A. (Natl. Med. Ctr., Mexico City). *Lab. Invest.* 24(4): 273-278, 1971.

Light and electron microscopic studies of the upper third of jejunal villi of white suckling rats were performed to observe changes in mitochondrial structure during absorption of water and nutrients. There was striking mitochondrial polarization in the lower half of the absorptive cells in nonfasted suckling rats and also in animals fed with cow's milk, but to a lesser degree. These mitochondria (type 1) showed changes characterized generally by increased matrix density and numerous cristae. Very often, mitochondria were close to each other, being almost in contact. Mitochondria (termed type 2) without quantitative or qualitative differences from those found in fasted suckling rats were seen in animals receiving glucose, saline, and distilled water. In these groups, mitochondria were also ovoid or elongated in shape, but had a light matrix and few frequently adherent cristae. These mitochondria were readily converted into type 1 mitochondria by the administration of rat's milk or other nutrients to the animals. Mitochondrial changes observed in the present study may indicate different levels of mitochondrial respiratory activity imposed by the intake and transport of the substances given.

1805 RENEWAL OF THE EPITHELIUM IN THE DESCENDING COLON OF THE MOUSE. I. PRESENCE OF THREE CELL POPULATIONS: VACUOLATED-COLUMNAR, MUCOUS AND ARGENTAFFIN. (E.) Chang, W. W. L. (Mt. Sinai Sch. Med., New York, N. Y.) and C. P. Leblond. *Am. J. Anat.* 131(1):73-99, 1971.

The epithelium of the descending colon of the mouse contained not only 3 recognized cell types, columnar, mucous and argentaffin cells, but also a distinct type, the vacuolated cells. Only 2 of the 4 main cell types were labeled 1 hr after ^{3}H-thymidine injection; they showed mitotic figures, namely vacuolated and mucous cells, which were located in the lower two-thirds of the crypts. After 36 hr, cells of the upper third of the crypts were labeled. Some of these cells were intermediate between vacuolated and columnar; others were true columnar cells. Labeled mucous cells at this level and an occasional labeled argentaffin cell toward the base of the crypts were also found. Labeled mucous and columnar cells were found on the surface by 3 days. Such labeled cells were extruded by the 4th day. On the basis of morphological features, distribution, and renewal behavior of epithelial cells, 3 cell lines may be described in the epithelium of the descending colon in the mouse: vacuolated columnar, mucous, and argentaffin. The 3 main cell lines would arise at the base of the crypts from divisions of poorly differentiated cells functioning as stem cells. Cells arising from their divisions would mostly be vacuolated columnar cells, but a minor proportion would evolve into mucous cells and a very small proportion into argentaffin cells.

1806 RENEWAL OF THE EPITHELIUM IN THE DESCENDING COLON OF THE MOUSE. II. RENEWAL OF ARGENTAFFIN CELLS. (E.) Chang, W. W. L. (Mt. Sinai Sch. Med., New York, N. Y.) and C. P. Leblond. *Am. J. Anat.* 131(1):101-109, 1971.

Histological examination of the epithelium of descending colon in the mouse showed that argentaffin cells had a light, finely granulated, roundish nucleus and a pale cytoplasm containing dark, iron hematoxylin-stained patches composed of many fine granules. Argentaffin cells, which comprised about 1.5% of the total epithelial cell population, were not labeled at 1 or 24 hr after the initiation of a continuous infusion of ^{3}H-thymidine; also, no mitotic figures were found. After 2 days, however, the argentaffin cells were labeled; the number of labeled cells increased with duration of continuous infusion. Observations pertaining to the position of each labeled cell indicated that argentaffin cells migrated upwards along the crypt walls, but did so more slowly than other epithelial cells (vacuolated columnar and mucous cells). Argentaffin cells probably arose from precursors observed at the base of the crypt. These precursors apparently are the poorly differentiated vacuolated cells seen in this location.

1807 RENEWAL OF THE EPITHELIUM IN THE DESCENDING COLON OF THE MOUSE. III. DIURNAL VARIATION IN THE PROLIFERATIVE ACTIVITY OF EPITHELIAL CELLS. (E.) Chang, W. W. L. (Mt. Sinai Sch. Med., New York, N. Y.). *Am. J. Anat.* 131(1):111-119, 1971.

In the colonic epithelium of the mouse, both mitotic activity and labeling frequency 1 hr after ^{3}H-thymidine injection varied with the time of the day, whether the vacuolated columnar or the mucous cell line was considered. Peak mitotic activity was observed at 10 a.m. for both cell lines. The nadir was not distinct in the vacuolated columnar cell line, but occurred at 10 p.m. in the mucous cells. The more differentiated proliferated cells were more susceptable to the diurnal variation in the rate of proliferation. Increased proliferation was associated with crypt enlargement, while decreased proliferatio had the opposite effect; the crypt size changes paralleled the variation in the proliferation rate of both vacuolated columnar and mucous cells. The number of cells migrating out of the crypt every 6 hr varied during the day in parallel with both cell production and number of crypt cells. The relative sizes of the 3 epithelial cell populations (mucous, argentaffin, and vacuolated columnar) showed little change with diurnal variation.

1808 A METHOD OF OBTAINING A SUSPENSION OF INTACT PARENCHYMAL CELLS FROM ADULT RAT LIVER. (E.) Gallai-Hatchard, J. J. (Lister Inst. Prevent. Med., London) and G. M. Gray. *J. Cell Sci.* 8(1):73-86, 1971.

Five different methods were used to obtain parenchymal cells from rat liver: they included (1) perfusion of a suspension of rat liver cells with Locke's solution containing 27 mM citrate; (2) perfusion of liver with Hank's solution (without Ca^{++}) containing 0.16% hyaluronidase and 0.10% collagenase; (3) perfusion of liver with a Ca^{++}- and Mg^{++}-free salt solution of high osmolarity and alkaline pH; (4) perfusion with a NaCl/sucrose solution in phosphate buffer at pH 7.8 containing 10^{-3} M tetraphenyl boron; and (5) perfusion with a solution of 0.1% trypsin in phosphate buffered saline/A followed by a solution of 0.3% collagenase and 0.3% hyalouronidase in 0.1% trypsin in phosphate buffered saline/A. With these 5 methods, the cell yields were 15%, 25%, 20%, 25%, and 2-4%, resp., while the fraction of cells permeable to eosin was 100%, 98%, 100%, 100%, and 0%, resp. Lactate dehydrogenase was readily lost from cells isolated by the first 4 methods, while after trypsinization, it was still present in an amount similar to that in liver homogenate. The ratio of this enzyme to glutamate oxalacetic transaminase was greatest for method 5 (2.100); the value for whole liver homogenate was 2.600. Phase contrast microscopy revealed no damage in cells prepared by any of the 5 methods, while electron microscopy revealed damaged membranes and swollen organelles in cells prepared by methods 1, 3, and 4.

1809 AGE CHANGES IN THE HUMAN LIVER OF THE DIFFERENT RACES. (E.) Sato, T. (Aichi Cancer Ctr. Hosp., Nagoya, Japan), T. Miwa and H. Tauchi. *Gerontologia* 16(6):368-380, 1970.

Autopsy studies of 240 Japanese and 214 Caucasians with no signs of liver disease or insufficiency (all males, aged 14-96 yr) showed that livers of Caucasians generally weighed more than those of Japanese, although both races showed a decreasing liver weight with advancing age. The number of liver cells in a given area of tissue decreased with age to some extent in both races; the Caucasians showed an earlier, but more gradual depression. In every decade, the Japanese had a significantly smaller number of liver cells. In Caucasians, the binucleate cell index increased with advancing age, reached a maximum value in the 6th decade, and decreased thereafter. In the Japanese, a more conspicuous change in the index was seen with advancing age, and the peak was reached about 10 yr later. Liver cells and their nuclei were generally larger in Caucasians than in the Japanese. Liver cell nuclei showed a tendency to increase in size with age; this tendency was more marked in the Japanese. Arteriosclerotic changes of the intrahepatic arteries increased with age in the Japanese, but no distinct relation between age and grade of sclerosis was noted in the Caucasians. It is concluded that environmental conditions, especially nutritional factors, may play a more important role than genetic factors in the differences between races in changes of the liver due to aging.

1810 DEVELOPMENT OF THE KERATOHYALIN GRANULES IN ESOPHAGEAL EPITHELIUM. (Jap.) Muto, H. (Nagoya City U. Med. Sch., Japan). *Kaibogaku Zasshi (Acta Anat. Nippon.)* 45(3):141-148, 1970.

1811 FLUORIMETRY OF SCHIFF-POSITIVE MUCOPOLYSACCHARIDES IN THE SERUM AND THE MUCOSA OF THE ESOPHAGUS, STOMACH, AND DUODENUM. (It.) Mori, G. (U. Milan Inst. Pharmacol., Italy). *Minerva Med.* 61(69):3574-3575, 1970.

1812 ULTRASTRUCTURE OF DIFFERENTIATING MOUSE PARIETAL CELLS. (Ger.) Pipan, N. (Med. Sch., Ljubljana, Yugoslavia). *Cytobiologie* 2(1):33-46, 1970.

1813 THE ENDOCRINE CELLS IN THE HUMAN PYLORIC ANTRUM. AN ELECTRON MICROSCOPE STUDY OF BIOPSY MATERIALS. (E.) Sasagawa, T. (Chuo Sogo Hosp., Nagaoka, Japan), S. Kobayashi and T. Fujita. *Arch. Histol. Jap.* 32(3):275-288, 1970.

1814 THE FINE STRUCTURE OF BOVINE GASTRIC EPITHELIA. (E.) Murray, M. (U. Glasgow Dept. Vet. Pathol., Scotland). *Res. Vet. Sci.* 11(5):411-416, 1970.

1815 TOPOGRAPHY OF THE SMALL INTESTINE IN MAN. (It.) Coppini, L. (U. Bologna Dept. Anat. Topography, Italy), F. Broccoli, M. D. Ghibellini and M. Pierotti. *Boll. Soc. Ital. Biol. Sper.* 46(5):253-257, 1970.

1816 MITOCHONDRIAL CHANGES IN COLUMNAR CELLS OF THE SMALL INTESTINE MUCOSA IN SUCKLING RATS. (Sp.) Gonzalez Licea, A. (IMSS Natl. Med. Ctr., Mexico City, Mexico). *Arch. Invest. Med.* 1(1):15-24, 1970.

1817 GASTROINTESTINAL STRUCTURE AND FUNCTION IN GERM-FREE OR GNOTOBIOTIC ANIMALS. (E.) Thompson, G. R. (Roy. Postgrad. Med. Sch., London) and P. C. Trexler. *Gut* 12(3):230-235, 1971.

1818 THE AGED HUMAN APPENDIX: ITS STRUCTURE AND IRON CONTENT. (E.) Greenberg, S. R. (Chicago Med. Sch., Ill.). *Gerontol. Clin. (Basel)* 12(6):366-376, 1970.

1819 REGIONAL DISTRIBUTION OF RED CELLS, PLASMA AND BLOOD VOLUME IN THE INTESTINAL WALL OF THE CAT. (E.) Jodal, M. (U. Goteborg Dept. Physiol., Sweden) and O. Lundgren. *Acta Physiol. Scand.* 80(4):533-537, 1970.

1820 PANCREAS ACINAR CELL REGENERATION. VII. PHOSPHATE CONTENT OF NUCLEAR HISTONES DURING PANCREAS DEGENERATION AND REGENERATION. (E.) Marsh, W. H. (State U. New York Downstate Med. Ctr., Brooklyn), M. Ord, L. Stocken and P. J. Fitzgerald. *Fed. Proc.* 29(4):1433-1438, 1970.

1821 ELECTRON MICROSCOPIC STUDIES ON THE EXISTENCE OF THE SO-CALLED "ACINAR ISLET CELLS" IN THE REGENERATING PANCREAS OF THE

RAT. (E.) Marx, M. (U. Ulm Clin. Res., Ctr., Germany), W. Schmidt, M. Herrmann and R. Goberna. *Hormone Metabol. Res. (Stuttg.)* 2(4):204-212, 1970.

1822 ULTRAHISTOCHEMICAL STUDIES OF THE GLYCOCALYX OF PARENCHYMAL CELLS AND CELLS OF THE VASCULAR WALL IN RAT LIVER. (Ger.) Geyer, G. (Friedrich Schiller U. Anat. Inst., Jena, Germany), W. Linss and A. Christner. *Acta Histochem. (Jena)* 37(2):223-232, 1970.

1823 CONTRIBUTION TO THE KNOWLEDGE OF LIVER INNERVATION. (Rev.) (E.) Gluhbegovic, N. (U. Sarajevo Med. Sch., Yugoslavia) and H. Hadziselimovic. *Folia Med. Fac. Univ. Sarav.* 5:59-69, 1970.

1824 CYTOCHEMICAL STUDIES ON THE ORIGIN OF BIZARRE, ACID PHOSPHATASE-RICH STRUCTURES IN RAT LIVER CELLS. (E.) Vorbrodt, A. (Inst. Oncol., Gliwice, Poland), S. Krzyzowska-Gruca, S. Gruca and W. Bartoszewicz. *Acta Histochem. (Jena)* 38(1):45-54, 1970.

1825 STATISTICAL EVALUATION OF THE EFFECT OF FIXATIVE SOLUTIONS OF DIFFERENT OSMOLARITY ON LIVER CELL ULTRASTRUCTURE. (Sl.) Kapeller, K. (Comenius U. Sch. Med., Bratislava, Czechoslovakia), P. Mraz and J. Polonyi. *Bratisl. Lek. Listy* 54(3):315-326, 1970.

1826 A NEGATIVE STAINING STUDY OF HUMAN ERYTHROCYTE GHOSTS AND RAT LIVER NUCLEAR MEMBRANES. (E.) Harris, J. R. (U. Edinburgh Dept. Zool., Scotland) and P. Agutter. *J. Ultrastruct. Res.* 33(3-4):219-232, 1970.

1827 INTERCELLULAR ADHESIONS. AN ELECTRON MICROSCOPE STUDY ON FREEZE-ETCHED RAT HEPATOCYTES. (E.) Spycher, M. A. (U. Zurich Histopathol. Inst., Switzerland). *Z. Zellforsch. M. Kvosk. Anat.* 111(1):64-74, 1970.

1828 NONHOMOGENEOUS BUT PARALLEL DISTRIBUTION OF ESSENTIAL TRACE ELEMENTS IN MULTIPLE ADJACENT SAMPLES OF SINGLE LIVERS, MEASURED BY NEUTRON ACTIVATION ANALYSIS. (E.) Schicha, H. (Julich Nuclear Res. Ctr., Germany), L. E. Feinendegen and K. Kasperek. *Beitr. Pathol. Anat.* 141(3):227-232, 1970.

1829 HISTOCHEMICAL INDICATIONS FOR LYSOSOMAL LOCALIZATION OF HEAVY METALS IN NORMAL RAT BRAIN AND LIVER. (E.) Brun, A. (U. Lund Inst. Pathol., Sweden) and U. Brunk. *J. Histochem. Cytochem.* 18(11):820-827, 1970.

1830 EFFECTS ON THE RAT'S LIVER AND PAROTID GLANDS OF CARIOGENIC DIETS WITH VARIED PROTEIN CALORIE LEVELS. A HISTOLOGICAL STUDY. (E.) Bunyard, M. W. (U. Bristol Dept. Dent. Med., England). *Br. Dent. J.* 129(7):319-324, 1970.

1831 VASCULARIZATION OF THE NERVOUS STRUCTURE OF CANINE GALLBLADDER. (Rus.) Krinitski, S. S. (Med. Inst., Ivanovo Frankovsk, USSR). *Arkh. Anat. Gistol. Embriol.* 59(9):84-89, 1970.

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1832 INTESTINAL IRON-TRANSPORT DEFECT IN THE MOUSE WITH SEX-LINKED ANEMIA. (E.) Manis, J. (Hosp. Joint Dis., New York, N. Y.). *Am. J. Physiol.* 220(1):135-139, 1971.

Everted duodenal gut sacs prepared from mice with sex-linked anemia (*sla*) showed a defect in the serosal transfer step of the active transport mechanism for iron that prevented the establishment of concentration gradients greater than 1.0 across the intestine. Also, more distal segments of intestine failed to demonstrate any compensatory increase in iron transport. Study of duodenal loops of *sla* mice *in vivo* demonstrated the serosal transfer defect. Heterozygous carrier females had a partial serosal transfer defect, suggesting partial dominance of the *sla* gene. The intestine in *sla* mice failed to demonstrate the normal adaptive characteristic of the iron transport mechanism when exposed to diets of varying iron composition. Calcium, galactose, and l-proline transport was normal for the *sla* group, suggesting that the genetic defect in the *sla* mice is specific for the serosal transfer step of the iron transport mechanism only, and is not part of a more generalized transport or metabolic defect. *Sla* mice apparently have a deficiency or absence of one or more substances necessary for the normal serosal transfer of iron.

1833 KINETICS OF INTESTINAL IRON ABSORPTION IN THE RAT: EFFECT OF COBALT. (E.) Thomson, A. B. R. (Queen's U. Dept. Med., Kingston, Ontario, Canada) and L. S. Valberg. *Am. J. Physiol.* 220(4):1080-1085, 1971.

The kinetics of intestinal iron absorption in the rat were studied by perfusing increasing concentrations of iron through the duodenum and, thus, obtaining dose-response curves. A linear increase in iron uptake by the duodenal mucosa was demonstrated in animals with loaded, normal, and decreased iron stores, whereas a curvilinear relationship was noted between iron concentration and iron transferred from intestinal cells into the body. When an equimolar concentration of cobalt was added to the perfusate, iron uptake was unaffected except at high doses in iron deficiency; however, there was a moderate decrease in iron transfer in normal animals and a marked decrease in iron-deficient animals. These studies suggest that in the absence of a need for iron, iron absorption is largely by a process of diffusion. In the presence of iron deficiency and to a lesser extent in iron-normal states, increased iron absorption is accomplished by the enhanced activity of a transport process which can be saturated with iron and inhibited by cobalt.

1834 EFFECT OF VARYING IRON STORES ON SITE OF INTESTINAL ABSORPTION OF COBALT AND IRON. (E.) Thomson, A. B. R. (Queen's U. Dept. Med., Kingston, Ontario, Canada), C. Shaver, D. J. Lee, B. L. Jones and L. S. Valberg. *Am. J. Physiol.* 220(3):674-678, 1971.

In iron-loaded germ-free albino rats, a small but similar proportion of the cobalt test dose was taken up by the duodenum, jejunum, and ileum, and about 30% of this passed to the body. Cobalt uptake and transfer in the duodenum in iron-normal animals were slightly increased compared with the iron-overloaded group. In iron deficiency, there was a further increase in cobalt uptake and transfer in the duodenum and the jejunum; however in the ileum, cobalt uptake and transfer were unaffected. Iron and cobalt uptake were similar in the duodenum and jejunum, but iron uptake was less than cobalt in the ileum. In iron-loaded animals, iron transfer was less than cobalt transfer throughout the intestine. In normal animals, the transfer of iron was equivalent to that of cobalt, and was significantly increased above the values in the loaded animals. Equivalent amounts of iron and cobalt were transferred from both the duodenum and jejunum in iron deficiency. As with cobalt, iron uptake and transfer in the ileum were unresponsive to iron store alterations. A direct linear relationship was seen between iron and cobalt uptake as well as between iron and cobalt transfer in the duodenum of animals with normal, diminished, and increased iron stores. Iron and cobalt apparently share a similar absorptive mechanism in the proximal, but not in the distal, intestine.

1835 THE INFLUENCE OF HYPOXIA ON IRON ABSORPTION IN THE RAT. (E.) Hathorn, M. K. S. (London Hosp. Med. Coll.). *Gastroenterology* 60(1):76-81, 1971.

Iron absorption remained at control levels after 2 and 4 hr of decompression (altitude 15,000 ft), began rising after 6 hr, and was doubled after 8 hr. Inhalation of an hypoxic oxygen-nitrogen mixture (10% oxygen) for 8 hr gave similar results. Plasma iron turnover before or during decompression was unchanged. Incorporation of injected iron into circulating RBC in decompressed rats was not significantly increased, thus showing no evidence of increased bone marrow uptake of iron. These results contrasted with those in anemic and hypertransfused rats who demonstrated an increase and decrease, resp., of injected iron incorporation into RBC. Hence in rats hypoxic for 8 hr, there was no evidence of changes in over all iron stores, iron transport mechanisms, or bone marrow activity at a time when iron absorption was double the control level. Increased iron absorption after hypoxia may result from changes in the mucosal cells of the small intestine induced directly or indirectly by hypoxia.

1836 STUDIES ON ZINC ABSORPTION: ^{65}Zn BINDING BY HOMOGENATES OF RAT INTESTINAL MUCOSA. (E.) Van Campen, D. R. (Agric. Res. Serv., Ithaca, N. Y.) and T. J. Kowalski. *Proc. Soc. Exp. Biol. Med.* 136(1):294-297, 1971.

Elution patterns were determined following treatment of Sprague-Dawley rats with ^{65}Zn in solution. Homogenates of intestinal mucosa were fractionated and the results compared to in vitro determinations. The patterns were similar (3 observed radioactive peaks) with the third peak corresponding to unbound ^{65}Zn. Zinc is apparently complexed or chelated, rather than incorporated, into the molecules at the time of synthesis. This is also suggested by the fact that ^{65}Zn dissociates during electrophoresis and migrates to the cathode. Electrophoresis of the material from the first Sephadex peak always yielded 10 or more visible protein bands; material from the second peak yielded 3 or 4 visible bands. However, because the zinc dissociated during electrophoresis, no specific evidence was found to link the proteins with an intestinal absorption mechanism.

1837 INTESTINAL ABSORPTION OF METALLIC MERCURY. (Ger.) Bornmann, G. (U. Munster Pharmacol. Inst., Germany), G. Henke, H. Alfes and H. Möllmann. *Arch. Toxikol.* 26(3): 203-209, 1970.

After adult male rats were given metallic Hg (2.5 g p.o. through a stomach tube), much of it was excreted in the stools or remained unchanged in the intestine after 72 hr. Blood and kidney Hg levels, determined by neutron activation analysis, increased to more than 10 times the control levels after 24 hr, and remained elevated or increased still further after 72 hr. Whole-body autoradiography with ^{203}Hg showed that much of the Mg remained in the gastrointestinal tract 48 hr after p.o. administration, and relatively large quantities were found in the kidneys. Not enough Hg was absorbed through the intestine to cause symptoms of Hg poisoning in any of the animals.

1838 THE UPTAKE OF HG^{203}Cl$_2$ BY THE INTESTINAL WALL OF THE DUODENAL AND ILEAL SEGMENT IN VITRO. (E.) Cikrt, M. (Inst. Indust. Hyg. Occup. Dis., Prague, Czechoslovakia). *Int. Z. Klin. Pharmakol. Ther. Toxikol.* 4(4):344-350, 1970.

In vitro uptake of ^{203}HgCl$_2$ by the duodenum and ileum was studied to determine the mechanism of transport of metals by the intestinal wall. Loss of ^{203}HgCl$_2$ in the incubation solution in the vapor and in the trapping of ^{203}Hg on the glass wall of the incubation vessel must be taken into consideration as possible sources of experimental error. Uptake of ^{203}Hg at both concentrations (10^{-5} and 10^{-6} M) was higher in the ileal segments than in the duodenal segments, even when nitrogen was bubbled through the medium. Ileal segments seemingly have a greater affinity for ^{203}Hg uptake in vitro.

1839 THE UPTAKE OF Hg^{203}, Cu^{64}, Mn^{52}, AND Pb^{212} BY THE INTESTINAL WALL OF THE DUODENAL AND ILEAL SEGMENT IN VITRO. (E.) Cikrt, M. (Inst. Indust. Hyg. Occup. Dis., Prague, Czechoslovakia). *Int. Z. Klin. Pharmakol. Ther. Toxikol.* 4(4):351-357, 1970.

Studies of in vitro uptake of ^{203}Hg, ^{64}Cu, ^{52}Mn, and ^{212}Pb by the ileum and duodenum were performed using a modified method of the inverted sac technique. A higher uptake was observed in the ileum for all metals except ^{52}Mn, and values in the serosal medium (except for ^{212}Pb) were always higher in the ileum. The low uptake of ^{52}Mn and the high ^{52}Mn values in the serosal fluid, together with a decreased uptake under anaerobic conditions, implicate an active transport of manganese through the intestinal wall in vitro. The lack of difference for ^{212}Pb in the ileum and duodenum serosal medium appears to be due to the binding of lead to the chelating agent.

1840 THE RELATIONSHIP BETWEEN CONCENTRATION AND UPTAKE BY RAT SMALL INTESTINE, IN VITRO, FOR TWO MICELLAR SOLUTES. (E.) Hoffman, N. E. (U. Western Australia Dept. Physiol., Nedlands) and V. J. Yeoh. *Biochim. Biophys. Acta* 233(1):49-52, 1971.

Everted sacs of rat small intestine (400-500 mg) were prepared and incubated for 15 min in an oxygenated phosphate buffer solution (pH 6.4). Sodium taurocholate and sodium taurodeoxycholate were synthesized and used in the medium in a 4:1 molar ratio. Sacs were then incubated with mixtures of ^{14}C-labeled oleic acid with monoolein or with α-glyceryl mono(9,10-$^{3}H_2$)oleyl ether. The presence of monoolein did not significantly affect uptake of oleic acid. When the two lipids, oleic acid and the monoether, were tested individually as single micellar solutes, both showed a linearly increasing uptake with increasing concentration, but the slope of the line for oleic acid was significantly steeper. In the case of incubation of 2 equimolar micellar solutions, the presence of monoether did depress the slope of the curve for uptake of oleic acid. When the 2 micellar solutions were incubated together in varying ratios, monoether depressed the uptake of oleic acid. The results suggest that the uptake of micellar lipids by everted sacs of rat intestine is a form of simple diffusion of single molecules, and not of intact micellar particles.

1841 TRANSFER OF ALANINE ISOMERS BY RAT SMALL INTESTINE. (E.) de la Noüe, J. (U. Laval Sch. Biol. Sci., Quebec, Canada), H. Newey and D. H. Smyth. *J. Physiol. (Lond.)* 214(1):105-114, 1971.

Transfer of 3 alanine isomers, L-alanine, D-alanine, and β-alanine, by the rat small intestine was studied using the everted sac technique. Both β-alanine and D-alanine were transported against a concentration gradient since the final serosal concentration was greater than the initial mucosal concentration. Mannitol decreased the mucosal transfer of both D-alanine and β-alanine, but the effect on β-alanine was not significant. The presence of mannitol did not, however, make any significant difference in the final concentration of serosal amino acid. While galactose inhibited the transfer of all 3 isomers, the presence of glucose stimulated transfer in all 3 cases, especially for D-alanine and β-alanine. Sarcosine inhibited transport of β-alanine, D-alanine, and L-alanine in descending order, while L-methionine inhibited transport in the reverse order in the presence and absence of glucose. β-Alanine seemed to be transferred mostly by the sarcosine carrier, while L-alanine was carried by the methionine carrier, with D-alanine occupying an intermediate position.

1842 INFLUENCE OF PROTEIN-FREE DIET ON THE DIGESTION OF PROTEINS AND ABSORPTION OF AMINO ACIDS IN THE GASTROINTESTINAL TRACT. (E.) Ziemlański, Ś. (Inst. Food Human Nutr., Warsaw, Poland), D. Cieślakowa and M. Pałaszewska. *Bull. Acad. Pol. Sci.* [*Biol.*] 18(10):649-656, 1970.

In vitro absorption of amino acids in isolated, everted intestinal sacs was considerably more intensive in rats fed a protein-free diet, especially in the duodenum. *In vivo* experiments revealed that a protein-free diet, as compared with the diet containing appropriate standard amounts of protein, which was applied for 2, 3 or 8 weeks produced considerably more intensive amino acid absorption in the rat gastrointestinal tract; changes in the amino acid level in peripheral blood were analogous to those found in portal blood, but less pronounced. Except for a few amino acids (isoleucine, phenylalanine, methionine and α-aminobutyric acid), the concentration of the particular free amino acids in the portal vein after the test feeding (1 ml of 7% protein hydrolyzate) was higher in rats previously maintained on a protein-free diet. There were no significant differences in protein digestion between rats fed a protein-rich and a protein-free diet. Regarding increased amino acid absorption in the gastrointestinal tract in animals kept on a protein-free diet, apparently passive diffusion of amino acids dominates over active transport characteristics for appropriate nutrition.

1843 ABSORPTION OF GLUCOSE, SODIUM, AND WATER BY THE HUMAN JEJUNUM STUDIED BY INTESTINAL PERFUSION WITH A PROXIMAL OCCLUDING BALLOON AND AT VARIABLE FLOW RATES. (E.) Modigliani, R. (St. Lazare Hosp., Paris) and J. J. Bernier. *Gut* 12(3):184-193, 1971.

Intestinal absorption was studied in 29 essentially normal people who swallowed a quadruple-lumened tube with a proximal occluding balloon that permitted infusion at the duodenojejunal junction and sampling from the next 25 cm of the small intestine. Subjects were infused at rates of 8, 10, 15 and 20 ml/min with increasing concentrations of glucose in solution. With the occluding balloon deflated, the absorption of glucose and water from the jejunum was significantly greater than when the balloon was inflated. The rate of glucose absorption increased with the rate of infusion. When the initial glucose concentration increased from 14 to 133 mM/liter, the stimulating effect of glucose on water and sodium movement increased gradually. At glucose concentrations greater than 133 mM/liter, there was a decrease in flux of water and sodium, despite a constant initial concentration of sodium. At high flow rates, absorption of water decreased and secretion rates of sodium and potassium increased.

1844 THE EFFECT OF NITROGEN MUSTARD INTOXICATION ON GLUCOSE ABSORPTION FROM THE SMALL INTESTINE OF THE RAT. (E.) Leibowitz, M. J. (Columbia U. Coll. Pharmaceut. Sci, New York, N. Y.) and P. C. Merker. *Gut* 12(2):123-125, 1971.

In vivo perfusion of the small intestine of Sprague-Dawley rats was performed at a rate of 1.2 ml/min for 80 min with either 50, 100, or 400 mg/100 ml glucose in a Krebs-Henseleit solution containing 4 mg/100 ml phenol red. Rats had previously received mechlorethamine at either an LD_{50} of 2 mg/kg 1 day before perfusion or 6 mg/kg 2 days before perfusion. After perfusion, gross examination of abdominal cavities revealed thin and flaccid intestines, hemorrhagic and dilated mesenteric blood vessels, and hemorrhagic ascites fluid. Both dosage groups showed decreased wet and dry intestinal weight, but this was significant only in the 6 mg/kg group. Both groups showed a decrease in absorption of glucose compared with controls, but this also was significant only in the group receiving 6 mg/kg. However, when the steady-state glucose absorption, corrected for dry tissue mass and length as well as for water movement, was plotted against initial glucose perfusion concentrations, this difference in absorption between controls and the 6 mg/kg group was not significant. Changes in glucose absorption, therefore, are attributed to loss of intestinal tissue rather than to a loss in ability to absorb glucose.

1845 THE INFLUENCE OF pH, BICARBONATE AND HYPERTONICITY ON THE ABSORPTION OF AMMONIA FROM THE RAT INTESTINE. (E.) Swales, J. D. (Roy. Infirm., Manchester, England), J. D. Tange and O. M. Wrong. *Clin. Sci.* 39(6):769-779, 1970.

Closed loops were constructed and cannulated in the jejunum, ileum, or colon of Wistar rats. Loops were then perfused with 8 buffered solutions of 70 mEq/liter of NH_4Cl, $NaCl$, NH_4HCO_3, or $NaHCO_3$, each at about pH 7 and 9, and with 4 unbuffered solutions of NH_4Cl at pH 5.13-5.26. Ammonia was readily absorbed from the rat intestine, and significantly more ammonia was absorbed from solutions buffered at higher pH values. There was also significantly greater absorption from the solutions of NH_4HCO_3 than from corresponding solutions of NH_4Cl. Generally, more bicarbonate accumulated in the saline solutions than in the corresponding NH_4Cl solutions. The absorption of bicarbonate was significantly greater from each of the ammonium solutions than from the sodium solutions, and was also significantly greater from both solutions at the lower pH values. The relation between pH, ammonia absorption, and bicarbonate was qualitatively similar in the jejunum, ileum, and colon. Ammonia absorption from the colon was significantly less than from the small intestine. Bicarbonate absorption from the jejunum was significantly greater than from the other 2 sites, while bicarbonate secretion into the ileum was significantly greater than into the other 2 sites. Absorption of ammonia from hypertonic solutions was significantly less than from iso- or hypotonic solutions. Absorption of hydrazine under these circumstances was similar to that of ammonia.

1846 HISTIDINE INFLUX ACROSS BRUSH BORDER OF RABBIT ILEUM. (E.) Chez, R. A. (U. Pittsburgh Sch. Med., Pa.), C. K. Strecker, P. F. Curran and S. G. Schultz. *Biochim. Biophys. Acta* 233(1):222-230, 1971.

Unidirectional flux of histidine across the brush border into absorptive epithelium was studied in segments of small intestine from New Zealand white rabbits. Using a mucosal solution containing 10 mM histidine and 140 mM NaCl, it was seen that uptake of histidine increased linearly with time. Lineweaver-Burk plotting showed that the influx of histidine at pH 7.4, in the presence and absence of Na^+, is a saturable process that can be described by Michaelis-Menten kinetics. A comparison of influx of histidine from a solution containing mannitol with one containing alanine showed significant inhibition of histidine influx by alanine in the absence of Na^+; this supported the conclusion that influx in the absence of Na^+ is a carrier-mediated process. Kinetic parameters of histidine influx in the presence and absence of Na^+ did not differ significantly at either pH 7.4 or 5.0; results were similar with lysine. In addition, the inhibition of histidine on lysine influx did not differ significantly at either pH.

1847 SECRETORY TRANSMEMBRANE POTENTIALS IN ACINAR CELLS FROM THE CAT SUBMANDIBULAR GLAND DURING PERFUSION WITH A CHLORIDE-FREE SUCROSE SOLUTION. (E.) Petersen, O. H. (U. Copenhagen Inst. Med. Physiol. C, Denmark) and G. Pedersen. *Pfluegers Arch.* 323(2):91-95, 1971.

In preparations of cat submandibular gland, there was no significant difference in the size of the secretory potentials recorded during perfusion of the gland with a chloride-free sucrose solution (23.6 millivolts) and the size of the potential recorded during perfusion with a normal NaCl Locke solution (20.6 millivolts). After brief intra-arterial injections of 1 μg of acetycholine, the maximal membrane potentials during perfusion with the chloride-free sucrose solution (51.8 millivolts) were higher than those seen during perfusion with the NaCl Locke solution (44.8 millivolts). It is concluded that the change in membrane potential after intra-arterial injection of acetycholine is due to an outward passive transport of K^+ which is partially short-circuited by an inward passive transport of Na^+.

1848 UPTAKE AND STORAGE OF CATECHOLAMINES IN MUCOSAL MAST CELLS OF THE RAT. (E.) Enerback, L. (U. Goteborg Inst. Pathol., Sweden) and J. Haggendal. *J. Histochem. Cytochem.* 18(11):803-811, 1970.

1849 MECHANISM OF ACTION OF INTESTINAL ANTIBODY IN EXPERIMENTAL CHOLERA. II. ANTIBODY-MEDIATED ANTIBACTERIAL REACTION AT THE MUCOSAL SURFACE. (E.) Freter, R. (U. Michigan Dept. Microbiol., Ann Arbor). *Infect. Immun.* 2(5):556-562, 1970.

1850 ACCUMULATION PREPARATION OF THE MUCOSA: A NEW METHOD FOR STUDYING THE INITIAL STAGES OF INTESTINAL ABSORPTION. (Rus.) Ugolev, A. M. (Pavlov Inst. Physiol., Leningrad, USSR), D. R. Zhigure and E. E. Nurko. *Fiziol. Zh. SSSR* 56(11):1638-1641, 1970.

1851 INTESTINAL ABSORPTION OF GLUCOSE, AND BLOOD GLUCOSE, AND HEMATOCRIT IN PREGNANT AND NONPREGNANT HAMSTERS. (E.) Musacchia, X. J. (Space Sci. Res. Ctr., Columbia, Mo.) and A. M. Hartner. *Proc. Soc. Exp. Biol. Med.* 135(2):307-310, 1970.

1852 THE UPTAKE OF $^{203}HgCl_2$ BY THE INTESTINAL WALL OF THE DUODENAL AND ILEAL SEGMENT IN VITRO. (E.) Cikrt, M. (Inst. Indust. Hyg. Occup. Dis., Prague, Czechoslovakia). *Int. Z. Klin. Pharmakol. Ther. Toxikol.* 3(4):344-350, 1970.

1853 DIGESTION, ABSORPTION AND TRANSPORT OF LIPIDS IN MAN. (Rev.) (Pol.) Krygier, T. (Med. Acad. Gastroenterol. Clin., Warsaw, Poland). *Pol. Tyg. Lek.* 25(26):986-989, 1970.

1854 DIFFERENCE IN 2-THENOYLTRIFLUOROACETONE SENSITIVITY OF ELECTRON TRANSPORT WITH AND AGAINST THE REDOX POTENTIAL GRADIENT. (E.) Streichman, S. (Israel Inst. Technol., Haifa) and Y. Avi Dor. *Biochim. Biophys. Acta* 216(2):262-269, 1970.

1855 ABSORPTION OF SYNTHETIC AND NATURAL FOLIC ACID COMPOUNDS. (E.) Ziemlanski, S. (Inst. Food Human Nutr., Warsaw, Poland), M. Wartanowicz and M. Palaszewska. *Bull. Acad. Pol. Sci.* 18(10):645-648, 1970.

1856 IN VITRO INTESTINAL TRANSPORT OF THIAMINE: ASYMMETRICAL LOCALIZATION OF THE THIAMINE KINASE IN THE INTESTINAL WALL. (It.) Ventura, U. (U. Pavia Inst. Human Physiol., Italy), G. Ferrari and G. Rindi. *Boll. Soc. Ital. Biol. Sper.* 45(23):1542-1546, 1970.

1857 IN VITRO INTESTINAL TRANSPORT OF THIAMINE: EFFECT OF Na^+. (It.) Ferrari, G. (U. Pavia Inst. Human Physiol., Italy), U. Ventura and G. Rindi. *Boll. Soc. Ital. Biol. Sper.* 45(23):1546-1549, 1970.

1858 INHIBITION OF VITAMIN E ABSORPTION BY A LIPID FRACTION. (E.) Akerib, M. (Int. Bio-Res. Inc., Anderten bei Hannover, Germany) and W. Sterner. *Int. J. Vitamin Nutr. Res.* 41(1):42-43, 1971.

See also numbers: 1804, 1903, 1955, 2016, 2034, 2055, 2056, 2063, 2069

1859 PATTERNS AND ORIGIN OF SOME ESOPHAGEAL RESPONSES TO STRETCH AND ELECTRICAL STIMULATION. (E.) Christensen, J. (U. Iowa Coll. Med., Iowa City). *Gastroenterology* 59(6):909-916, 1971.

Responses to stretch and to electrical stimulation of the distal 12 cm of the esophagus of 50 adult opossums were studied to determine if these responses were direct responses of the muscle or due to local reflexes. Distension of a balloon at any point along the smooth muscle segment produced a burst of action potentials chiefly rostral to the point of stretch with a delay of 0.29 to 0.36 sec. Deflation caused a burst of action potentials mainly caudal to the point of stretch with a delay of 0.96 to 1.08 sec. These represent the "on and off" responses, resp.; both responses were found with all distension levels. Tetrodotoxin in a concentration of 10^{-7}M abolished the "off" response, but did not affect the "on" response. Phenoxybenzamine (10^{-5} M), tolazoline (10^{-4} M), hexamethonium (10^{-4} M), atropine (10^{-5} M), or methysergid (10^{-5} M) did not affect either response. The "on" response seems to be a direct response of the muscle to stretch, while the "off" response appears to be a noncholinergic neural excitation.

1860 CONTRACTILE ACTIVITY OF GASTRIC ANTRUM AND TAENIA COLI IN THE UNANESTHETIZED MONKEY. (E.) Weisbrodt, N. W. (U. Michigan Med. Sch., Ann Arbor), C. C. Hug, Jr., J. N. Wiley and P. Bass. *J. Appl. Physiol.* 30(2):276-280, 1971.

Contractile activity of the gastric antrum and the teniae coli was studied in 9 unanesthetized rhesus monkeys using strain-gauge transducers implanted on antral circular muscle and teniae of the ascending, transverse, and descending colon. The gastric antrum, when active, contracted at a regular frequency of 3-4 contractions/min; the onset and duration of activity appeared randomly. In the teniae, activity was present 20-50% of the recording time, with the activity increasing with more distal locations. The frequency of contractions and the wave forms recorded at each site along the colon was irregular, and there was no temporal relation in activity among the 3 sites. Following the administration of food, there was an immediate increase in activity in the antrum and the teniae. Neostigmine (30 μg/kg i.v.) produced an increase in contractile activity of all areas monitored. Atropine (50 μg/kg i.v.) and nicotine (250 μg/kg i.v.) both inhibited spontaneous and neostigmine-induced contractile activity in all areas. 5-Hydroxytryptophan (600 μg/kg/min i.v.) stimulated antral activity and inhibited activity of the teniae.

1861 THE RELATIONSHIPS OF GASTRIC TRANSECTION AND VAGOTOMY TO GASTRIC EMPTYING. (E.) Kilby, J. O. and C. A. Griffith (1041-116th, NE, Bellevue, Wash.). *Surgery* 69(4):633-636, 1971.

The rate of gastric emptying was measured radiographically by administering barium sulfate mixed with a standard meal to dogs before and after transection and anastomosis of the stomach at various levels, with and without preservation of the vagal fibers to the stomach distal to the transection. With preservation of vagal fibers, transections in the distal, medial, and proximal portions of the stomach did not alter the rate of gastric emptying. Delayed emptying occurred only with division of vagal fibers. After transection of the stomach and division of the vagal fibers at the antrum-corpus level, development of gastric stasis was inconsistent, and only minimal when it was present. Significant stasis developed only after gastric transection and division of the vagal fibers at the mid-stomach or more proximal levels.

1862 STUDIES OF THE EFFECT OF METOCLOPRAMIDE AND APOMORPHINE ON GASTRIC EMPTYING AND SECRETION IN MAN. (E.) Ramsbottom, N. (Guy's Hosp. Med. Sch., London) and J. N. Hunt. *Gut* 11(12):989-993, 1970.

Healthy male subjects were studied to determine if the effect of metoclopramide and apomorphine on gastric emptying and secretion is mediated by duodenal osmoreceptors. No consistent effect on gastric emptying of the test meals of glucose citrate was observed after metoclopramide (0.20 mg p.o. or i.v.) administration. Gastric emptying of sodium citrate test meals was slowed considerably by 0.25 mg apomorphine (i.v.), a dose which produced either no nausea or only transient nausea. Ten milligrams of metoclopramide abolished the slowed gastric emptying produced by apomorphine. The ineffectiveness of metoclopramide in hastening gastric emptying may have been due to the lack of stress in the healthy subjects used in this study.

1863 GASTRIC REFLUX DURING PERFUSION OF THE PROXIMAL SMALL BOWEL. (E.) Gustke, R. F., R. R. Varma and K. H. Soergel (Milwaukee County Gen. Hosp., Wis.). *Gastroenterology* 59(6):890-895, 1971.

Variations in reflux into the stomach during constant perfusion of the proximal small intestine were studied in male subjects free of hepatic, renal, endocrine, or intestinal disease. The mean percentage reflux decreased significantly with the more distal perfusion sites from 20.9%

for all duodenal to 3.6% for all jejunal infusions. The percentage reflux was significantly higher during duodenal than jejunal infusions at all infusion rates above 2 ml/min. At all rates of infusion into the duodenum, there was a decrease in the percentage of reflux during the 20 min period after administration of an oral bolus, with a partial return to initial reflux values during the next 20 min. There was a marked increase in reflux following the administration of propantheline bromide. Composition and osmolality of the test solution had no effect on reflux. At infusion rates greater than 2 ml/min, the infusion tip should be located distal to the ligament of Treitz to decrease variability of results.

1864 LOCALIZATION OF THE DUODENAL PACEMAKER AND ITS ROLE IN THE ORGANIZATION OF DUODENAL MYOELECTRIC ACTIVITY. (E.) Hermon-Taylor, J. (London Hosp.) and C. F. Code. *Gut* 12(1): 40-47, 1971.

The electric activity of the smooth muscle of the duodenum, and in some cases of the gastric antrum, was recorded from surgically implanted electrodes before and after myotomy. Following annular myotomy approximately 1 cm proximal to the biliary ampulla, the frequency of the pacesetter potential distal to the cut was always less than the frequency in the duodenum proximal to the cut. Thus, the greatest intrinsic frequency of the pacemaker potential is not in the region of the biliary ampulla, but is in a more proximal portion of the duodenum. Myotomy on the pylorus or 5 mm distal to the pylorus had no detectable effect on the frequency of duodenal potential. When the myotomy was placed more than 6 mm distal to the pylorus, there was a significant reduction in mean frequency of the pacemaker potential on the distal side of the cut. The duodenal pacemaker seems to be limited to the first 5 or 6 mm of duodenum distal to the pylorus. Distal conduction of the potential and distal propagation of action potentials were observed before myotomy; however, after myotomy, orderly distal propagation of action potentials was not seen.

1865 THE EFFECT OF METOCLOPRAMIDE ON GASTRODUODENAL AND GALLBLADDER CONTRACTIONS. (E.) Johnson, A. G. (Charing Cross Hosp. Med. Sch., London). *Gut* 12(2):158-163, 1971.

Contraction of the stomach, duodenum, and gallbladder after metoclopramide (2 mg/kg, i.v.) stimulation was studied in dogs. Metoclopramide produced an immediate increase in the strength of antral contractions without affecting the rate in all animals which exhibited spontaneous antral contractions. In 9 animals without spontaneous antral activity, metoclopramide (3 mg/kg) was without effect, however, these animals did respond to pancreozymin and carbachol. Duodenal response was determined by antral activity; metoclopramide produced stronger, more regular contractions when there was spontaneous activity. Metoclopramide produced single duodenal contractions following each antral contraction; thus, it increased the dominance of the antral contraction rate and rhythm over that of the duodenum. Metoclopramide had no effect on gallbladder pressure which responded in all cases to pancreozymin. Metoclopramide potentiated the effect of pancreozymin on the stomach and duodenum, but not on the gallbladder. The effects of pancreozymin on the antrum and duodenum were blocked by atropine; thus, metoclopramide seems to act by enhancing the local effect of acetylcholine.

1866 SOME OBSERVATIONS ON THE BEHAVIOUR OF ISOLATED AND INTERPOSED JEJUNAL AND ILEAL SEGMENTS IN THE RABBIT. (E.) Jenkins, D. H. R. (U. Edinburgh Dept. Clin. Surg., Scotland) and I. B. MacLeod. *Br. J. Surg.* 57(11):835-840, 1970.

Providing a segment of jejunum or distal ileum is supplied by more than 1 vessel, the degree of obstruction, caused by antiperistaltic interposition of such a segment, is directly related to its length. The length of a segment is also an index of the number of vessels supplying it. Pressure proximal to an interposed antiperistaltic segment is related to the number of vessels supplying that segment. Interposed single vessel segments of rabbit jejunum of either polarity, as opposed to ileum, caused a uniformly low degree of obstruction. This type segment, which behaves in a constant manner, may be used in the treatment of severe dumping syndrome. Similar segments of distal ileum cause an unpredictable degree of obstruction, and those exhibiting high tone may be suitable for sphincter substitution. Antiperistaltic segments of both jejunum and ileum supplied by more than 1 vascular pedicle cause a degree of obstruction related to their length, and may be useful in treating rapid intestinal passage by producing a graded degree of obstruction. Isoperistaltic segments of jejunum and ileum supplied by 2 or more vessels do not cause obstruction, and can safely be used in establishing continuity between widely separated parts of the gastrointestinal tract.

1867 ONTOGENETIC DEVELOPMENT OF CHOLINERGIC RECEPTOR FUNCTION IN GUINEA PIG ILEUM. (E.) Boréus, L. O. (Karolinska Hosp., Stockholm, Sweden) and D. M. McMurphy. *Acta Physiol. Scand.* 81(1):143-144, 1971.

Acetylcholine dose-effect curves obtained from in vitro experiments on fetal, newborn, young, and adult guinea pigs were compared. As the weight of the guinea pig increased, there was also an increase in maximum tension elicited in the smooth muscle of ileum by acetylcholine. However, there was no change in the pD_2 values (negative log of molar concentration) for the mean acetycholine doses which gave 50% of the maximum contractile response during development. In both guinea pig and human (as previously reported) fetal ileum, the strength of the contractile response increases with age up to the point of maturity, but the affinity of acetylcholine for the cholinergic receptor does not change during development. The increase in the strength of contractile response with age may be due to an increase in efficiency of the smooth muscle rather than to fetal or neonatal development of receptor function.

1868 DIFFERENTIAL RESPONSE OF LONGITUDINAL AND CIRCULAR MUSCLES OF INTACT CANINE COLON TO MORPHINE AND BETHANECHOL. (E.) Rinaldo, J. A., Jr. (Providence Hosp., Southfield, Mich.), E. A. Orinion, R. V. Simpelo, F. E. Check and W. Beauregard. *Gastroenterology* 60(3):438-444, 1971.

Healthy female beagles were prepared with in vivo extraluminal force transducers permanently implanted in the proximal and distal portions of the large bowel. Increased motor activity and tension of the circular muscle, but not of the longitudinal muscle, of the colon was produced by a single i.v. injection of 600 µg/kg of morphine sulfate. Increased motor activity and tension of both longitudinal and circular muscle were seen after a single i.v. injection of 50 µg/kg of bethanechol chloride. For both agents, the increased circular muscle tension was greater in the distal than in the proximal colon. The bethanechol effect was seen at both levels of the colon, but it caused a greater motor response of the longitudinal muscle in the distal than in the proximal colon. Both the linear displacement and motility index methods measured changes in motility with equal sensitivity, but the former method is preferable because of its smaller coefficient of variation.

1869 RELAXING AND METABOLIC ACTIONS OF ACTH IN RABBIT COLON. (E.) Andersson, R. (Sch. Med., Linkoping, Sweden), E. Mohme-Lundholm, N. Svedmyr and N. Vamos. *Acta Physiol. Scand.* 81(1):11-17, 1971.

Tests were performed on isolated rabbit colon suspended in a 30 ml Krebs-Henseleit bicarbonate buffer solution at 37C and bubbled with 95% O_2 and 5% CO_2. Contraction induced by carbachol (2.5×10^{-7} g/ml) was inhibited by 0.15-0.60 IU/ml of ACTH; this relaxation was dose-dependent, beginning after a latency period of about 20 sec, peaking after 3 min, and lasting at least 15 min. The relaxing action of 0.15 IU/ml of ACTH was completely blocked by the β-adrenergic blocking agent sotalol [4-(2-isopropylamino-1-hydroxyethyl) methanesulfonanilide hydrochloride in a concentration of 1.2×10^{-5} g/ml; at higher concentrations, ACTH competitively overcame the blocking action of sotalol. The relaxing action of ACTH was significantly potentiated by theophylline (1×10^{-4} g/ml) and puromycin (7.5×10^{-5} g/ml). The action of ACTH was weakened by replacement of Na^+ in the buffer solution with 145 mEq/liter of K^+. The relaxing action of ACTH was blocked by increasing the buffering capacity of the muscle by the addition of $NaHCO_3$. Within 90 sec of addition of 0.3 IU/ml of ACTH, the muscle content of cyclic AMP was doubled; the activity of phosphorylase a was significantly increased within 60 sec of addition of ACTH. There was a dose-dependent relation between the relaxing and the phosphorylase a-increasing effects. In contrast to ACTH, isoproterenol and cyclic AMP reduced the concentrations of ATP and creatine phosphate. After prepreatment of the muscle with sotalol (1.2×10^{-5} g/mole), all metabolic actions of ACTH were completely blocked.

1870 COMPUTER SIMULATION OF INTESTINAL SLOW-WAVE FREQUENCY GRADIENT. (E.) Diamant, N. E. (Toronto Western Hosp., Ontario, Canada), P. K. Rose and E. J. Davison. *Am. J. Physiol.* 219(6):1684-1690, 1970.

With a digital computer, a series of Van der Pol relaxation oscillators with successively decreasing frequencies was loosely coupled, with provision for alteration of coupling between oscillators. Many previously-observed biological activities of the intestine were reproduced. A step-wise frequency gradient was demonstrated with zones of waxing and waning of activity at the start of each frequency plateau. The degree of coupling between oscillators was the most important factor in determining how the intrinsic frequency gradient was manifest. A relative uniformity of slow-wave frequency at any level of the intestine and the circumferential synchrony of the slow wave, both partially the result of the syncitial properties of intestinal muscle, suggest that the intestine can be considered a 1-dimensional system in terms of slow-wave frequency. That is, at any intestinal level, virtually all cells are beating in unison and at the same slow-wave frequency.

1871 BOWEL SOUND QUANTITATION TO EVALUATE DRUGS ON GASTROINTESTINAL MOTOR ACTIVITY. (E.) Martin, D. C. (Kansas City Gen. Hosp. Med. Ctr., Mo.), G. L. Beckloff, J. D. Arnold and S. Gitomer. *J. Clin. Pharmacol.* 11(1):42-45, 1971.

Recording of bowel sounds (by using a microphone and a recorder with medium-input amplification) under rigidly controlled conditions, such as control of food intake and strict posture control, may provide a suitable method for the screening of drugs that have the potential to affect gut motility. The overall antimotility effect of dicyclomine, oxybutynin, and atropine was demonstrated. This methodology may also be used in the evaluation of a dose-response relationship, estimation of time for onset of drug action, and determination of duration of drug action.

1872 POSSIBLE USE OF TRANSINTESTINAL ("END-TO-END") INTUBATION IN PHYSIOPATHOLOGICAL STUDIES ON THE GASTROINTESTINAL TRACT IN CHILDREN. (It.) Di Martino, L. (U. Catania Inst. Spec. Pathol. Surg., Italy), F. Mollica, G. Gula, M. La Rosa, B. Santonocito and M. Pisano. *Boll. Soc. Ital. Biol. Sper.* 46(22):928-931, 1970.

End-to-end intubation (according to Blankenhorn's method modified by Provenzale) using a polyvinyl tube (diameter 1 mm) with a small mercury-filled balloon at the distal end was performed in 53 children between the ages of 2.5 months-12 yr. The average length of time required for passage of the balloon through the intestine was 2-7 (median 3) days. No particular difficulties were encountered, except in children with marked tonsillar hypertrophy. The method was well-tolerated even for periods of 20-25 days. Results of physiopathological studies using this method will be published later.

1873 EARLY RESULTS OF STUDIES ON ELECTRICAL ACTIVITY IN THE COLON OF CHILDREN. (It.) Di Martino, L. (U. Catania Inst. Spec. Pathol. Surg., Italy), F. Mollica, G. Gula and M. Pisano. *Boll. Soc. Ital. Biol. Sper.* 46(22): 932-935, 1970.

Bioelectrical studies of smooth muscle fiber cells of the colon were performed in 22 children (age 4 months-9 yr; 13/22 less than 1 yr old) without evidence of gastrointestinal disease. Electrode-containing plexiglass cups were inserted by end-to-end intubation to the desired level of the colon. In the ascending colon and right half of the transverse colon, arrhythmic and irregular slow waves with atypical, isolated spike potentials were noted. In the descending colon and left half of the transverse colon, the slow waves showed a basic electrical rhythm (8-16/min) and greater amplitude than in the ascending colon. Spike potentials appeared as "bursts," probably because of the increased peristalsis in this portion of the colon. The sigmoid colon showed a basic electrical rhythm with irregular slow waves of greater amplitude. Spike potentials were more frequent and took the form of singles, bursts and repeats. Bioelectrical findings were similar during sleep, in all children regardless of age, and in adults as well as children.

1874 MEASUREMENT OF ENDOESOPHAGEAL PRESSURE IN THE NEWBORNS. (E.) Senterre, J. (Liege Natl. U. Pediatr. Clin., Belgium) and F. Geubelle. *Biol. Neonate (Basel)* 16(1-3):47-53, 1970.

1875 MOTILITY OF THE ESOPHAGUS IN CHILDREN. (MANOMETRIC STUDY). (It.) Fioretti, G. P. (U. Naples Inst. Pediatr. Surg., Italy), C. Pignatelli and G. Amici. *Riv. Chir. Pediatr.* 12(4):431-440, 1970.

1876 RESPONSE OF THE ISOLATED STOMACH TO STIMULATION OF EXTERNAL AND INTERNAL AUTONOMIC NERVES. (E.) Hukovic, S. (U. Sarajevo Med. Sch., Yugoslavia) and D. Stankovic. *Folia Med. Fac. Univ. Sarav.* 5:221-229, 1970.

1877 INHIBITORY AND EXCITATORY EFFECTS OF SYMPATHOMIMETIC AMINES ON MUSCLE STRIPS FROM THE STOMACH OF THE GUINEA PIG. (E.) Bailey, D. M. (City of Leicester Polytechn. Sch. Pharm., England). *Br. J. Pharmacol.* 41(2): 227-238, 1971.

1878 PATHOPHYSIOLOGY OF GASTRIC EMPTYING. (Ger.) Stellamor, K. (Hosp. Charitable Brothers, Vienna, Austria). *Roentgenblatter* 23(12):599-610, 1970.

1879 RADIOLOGICAL STUDY OF THE FUNCTIONAL ANATOMY OF THE STOMACH. (Fr.) Dankmeijer, J. (U. Leiden Lab. Anat. Embryol., Netherlands) and M. Miete. *C. R. Assoc. Anat.* 147:219-223, 1970.

1880 THE CONTROL OF GASTRIC MOTILITY BY THE GASTRIC PACESETTER POTENTIAL. (E.) Kelly, K. A. (Mayo Clin. Found., Rochester, Minn.) and C. F. Code. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):99-101, 1970.

1881 A CONCEPT OF MOTOR CONTROL BY THE PACESETTER POTENTIAL IN THE STOMACH AND SMALL BOWEL. (E.) Code, C. F. (Mayo Clin. Found., Rochester, Minn.), J. H. Szurszewski and K. A. Kelly. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):67-68, 1970.

1882 THE FREQUENCY, VELOCITY AND CYCLE LENGTH OF THE PACESETTER POTENTIAL (PP). (E.) Szurszewski, J. H. (Mayo Found. Sect. Physiol., Rochester, Minn.) and C. F. Code. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):103-105, 1970.

1883 ELECTRONIC MODELING OF THE GASTRIC AND SMALL INTESTINAL PACEMAKERS AND CONDUCTION MECHANISMS. (E.) Nelsen, T. S. (Stanford U. Sch. Med., Calif.). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):75-77, 1970.

1884 THE ELECTRIC AND MECHANICAL ACTIVITY OF THE GASTRODUODENAL JUNCTION. (E.) Bass, P. (Parke, Davis & Co. Res. Lab., Ann Arbor, Mich.). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):93-95, 1970.

1885 ELECTROMYOGRAPHIC STUDIES ON THE MECHANISM OF PYLOROSPASM FOLLOWING VAGOTOMY. (E.) Shiratori, T. (Tohoku U. Sch. Med., Sendai, Japan). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):141-146, 1970.

1886 BIOELECTRICAL ACTIVITY OF THE STOMACH AND DUODENUM AFTER SECTION OF THE STOMACH AT THE LEVEL OF INCISURA ANGULARIS. (E.) Atanassova, E. *Izv. Inst. Fiziol. Rast. Metodi Popov* 13:243-250, 1970.

1887 THE ELECTRICAL ACTIVITY OF THE STOMACH AND UPPER INTESTINE AS DETERMINANT OF MECHANICAL ACTIVITY. (E.) Daniel, E. E. (U. Alberta Dept. Pharmacol., Edmonton, Canada) and J. Irwin. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):97-98, 1970.

1888 DIFFERENCES IN THE ACTION OF PENTAGASTRIN AND GASTRIN ON HUMAN GASTRIC AND COLONIC SMOOTH MUSCLE. (E.) Waller, S. L. (Cent. Middlesex Hosp., London) and J. J. Misiewicz. *R. C. Rom. Gastroenterol.* 2(3):159-166, 1970.

1889 A DIRECT MANOMETRIC STUDY OF THE CANINE CHOLEDOCHODUODENAL JUNCTION. THE EFFECT OF ATROPINE. (E.) Crispin, J. S. (U. Manitoba Dept. Surg., Canada), Y. W. Choi and D. G. H. Wiseman. *Arch. Surg.* 101(2):215-218, 1970.

1890 PHARMACOLOGICAL EFFECTS OF BILE SALTS ON SMOOTH MUSCLE OF ISOLATED GUINEA PIG ILEUM. (Jap.) Kubota, K. (Univ. Sch. Pharmaceut. Sci., Tokyo), T. Uruno, T. Kondo and M. Tomizawa. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(3):197-201, 1970.

1891 INHIBITION OF SMALL INTESTINE MOTILITY BY ORAL ADMINISTRATION OF N-BUTYL-SCOPOLAMINE. (Fr.) Schmid, E., A. Bleichet, J. Kitzing and U. Ritter. *J. Med. Chir. Prat.* 142(8): 297-301, 1971.

1892 THE ELECTRICAL ACTIVITIES OF GUINEA PIG SMALL INTESTINE. (E.) Hukuhara, T. (Okayama U. Med. Sch., Japan). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2): 89-91, 1970.

1893 INTERPRETATION OF THE ELECTROMYOGRAM OF THE SMALL INTESTINE AS RECORDED WITH EXTERNAL ELECTRODES. (E.) Holman, M. E. (Monash U. Dept. Physiol., Clayton, Australia). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):73-74, 1970.

1894 ACTION POTENTIALS OF THE RECTUM BY BALLOON METHOD. (E.) Matsuoka, K. (Osaka U. Sch. Med., Japan). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):155-157, 1970.

1895 CALCIUM MOVEMENT AND ACTION POTENTIAL IN SMOOTH MUSCLE. (E.) Suzuki, T. (Tohoku U. Sch. Med., Sendai, Japan) and J. Nagasawa. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):109-111, 1970.

1896 BIPHASIC ELECTRICAL IMPULSES FOR THE STIMULATION OF INTESTINAL MOTILITY. (Ger.) Wanjura, H. J. (U. Berlin Surg. Clin., Germany) and J. Waldschmidt. *Arch. Phys. Ther. (Leipz.)* 22(4):211-213, 1970.

1897 IONIC BASIS OF INTESTINAL POTENTIALS CONDUCTION OF SPIKES AND SLOW WAVES. (E.) Prosser, C. L. (U. Illinois Dept. Biol., Urbana). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):69-70, 1970.

1898 THE FUNCTION OF INTESTINAL SLOW WAVES IN COORDINATING MECHANICAL ACTIVITY. (E.) Bortoff, A. (State U. New York Dept. Physiol., Syracuse). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(2):87-88, 1970.

1899 DRUG EFFECTS ON ACETYLCHOLINE-INDUCED CONTRACTION. (Rus.) Esyrev, O. V. (Inst. Physiol., Alma-Ata, USSR) and A. D. Pak. *Tsitologiia* 12(10):1343-1345, 1970.

1900 EFFECTS OF CAERULEIN ON SMALL AND LARGE BOWEL MOTILITY IN MAN. (E.) Ramorino, M. (U. Rome 2nd Med. Clin.), M. Ammaturo and F. Anzini. *R. C. Rom. Gastroenterol.* 2(3):172-175, 1970.

1901 EFFECTS OF N-METHYL-HYOSCINE METHYL SULFATE (DD-234 OR 1290 CERM) ON GASTROINTESTINAL MOTILITY AND SALIVATION. (E.) Hukuhara, T. (Okayama U. Med. Sch., Japan), S. Nakayama, H. Fukuda, T. Neya and K. Tsuchiya. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4):263-269, 1970.

See also numbers: 1915, 2079, 2664

1902 METABOLIC ALTERATIONS ACCOMPANYING α-AMYLASE SECRETION BY RAT PAROTID TISSUE IN VITRO. (E.) Ueha, T., O. Catanzaro, R. Hanson and R. H. Lindsay (VA Hosp., Birmingham, Ala.). *Am. J. Physiol.* 220(2):312-318, 1971.

Addition of 10 μg/ml pilocarpine or 3.3 μg/ml epinephrine to in vitro preparations of parotid glands from Sprague-Dawley rats caused a loss of α-amylase in the tissue and a subsequent increase in the incubation medium. This was accompanied by an increased rate of oxidation of glucose (up to 120-160%), amino acids (100%), and β-hydroxybutyric acid (40%). In contrast, a 20-40% depression of energy-requiring processes such as synthesis of tissue protein by the incorporation of amino acid and glucosamine was seen. It is concluded that stimulation of α-amylase secretion by parotid glands is accompanied by both increased oxidation and decreased glycoprotein and pyrimidine nuckeotide synthesis.

1903 MEMBRANE POTENTIALS IN PAROTID GLANDS OF CATS WITH DEGENERATION SECRETION. (E.) Fritz, M. E. (Emory U. Sch. Dent., Atlanta, Ga.). *Am. J. Physiol.* 220(4):1025-1027, 1971.

Membrane potentials and flow of saliva from the excretory duct of the parotid gland were recorded in 9 anesthetized cats, 6 of which had been subjected 24-36 hr previously to section of the postganglionic parasympathetic secretomotor nerve and which exhibited degeneration secretion. Analysis of 374 units located 0-339 μ from the surface of the gland revealed that 237 units recorded from the glands whose secretomotor nerve had been sectioned displayed a significant hyperpolarization when compared to 137 units in 3 cats with an intact secretomotor nerve. These results are consistent with the view that the phenomenon of degeneration secretion is due to the release of acetylcholine by the severed nerve, and to subsequent activation of secretory elements by the increased amounts of acetylcholine.

1904 PROTEOLYTIC ACTIVITY OF SALIVA IN THE ELDERLY. (Pol.) Halawa, B. (Med. Acad. 3rd Intern. Dis. Clin., Wroclaw, Poland) and W. Mazurek. *Pol. Tyg. Lek.* 25(51):1976-1979, 1970.

See also number: 1901

STOMACH

1905 EFFECT OF NAUSEA ON HUMAN GASTRIC SECRETORY RESPONSES. (E.) Cohen, M. M., H. T. Debas, I. B. Holubitsky (U. British Columbia Dept. Surg., Vancouver, Canada) and R. C. Harrison. *Am. J. Dig. Dis.* 16(2):156-159, 1971.

In 3 healthy subjects (2 men, 1 woman; all nonsmokers) in whom double-lumened nasogastric tubes had been passed, a 15-min basal collection of gastric contents was made before the experiment began. Then, maximum acid output in response to a dose of 6 μg/kg pentagastrin was determined, and the patients received a dose of pentagastrin which would produce an output response 50% of the maximal. The plateau of acid secretion was obtained when values for 3 consecutive 15-min acid output periods varied by less than 15%. Cigarette smoking by these nonsmokers had no significant effect on the pentagastrin-stimulated submaximal plateau of acid or pepsin secretion. When these patients simultaneously experienced nausea associated with smoking, there were significant decreases in both output of acid and of pepsin. It is concluded that nausea markedly inhibits the gastric secretory response in healthy humans.

1906 EFFECT OF CIGARETTE SMOKING ON HUMAN GASTRIC SECRETORY RESPONSES. (E.) Debas, H. T. (U. British Columbia Dept. Surg., Vancouver, Canada), M. M. Cohen, I. B. Holubitsky and R. C. Harrison. *Gut* 12(2):93-96, 1971.

Subjects consisted of 12 healthy human volunteers who were denied food and cigarettes for an 8-hr period before each test. A double-lumened nasogastric tube was placed in the most dependent part of the stomach; the stomach was aspirated; and a 15-min basal collection was obtained. Continuous i.v. infusion of 0.15 M NaCl (46 ml/hr) was given in each test, and pentagastrin was added to the infusion in appropriate concentrations. With serial infusions of increasing doses of pentagastrin, it was possible to calculate for each subject that dose which, when given by continuous i.v. infusion, stimulated an acid secretion equal to 50% of the maximum response. Control plateaus were obtained in 6 subjects such that a plateau was considered achieved when 3 consecutive acid outputs over a 15-min period varied by less than 15%. Each subject then underwent 5 smoking tests in which, as soon as the pentagastrin plateau was achieved, the subject smoked 3 of the same filter-tipped cigarettes over a period of 1 hr. Nausea occurred in 6 tests in 5 subjects and these were discarded, leaving 54 tests for analysis. In these 54 tests, the overall effect of smoking 3 cigarettes on the pentagastrin-stimulated submaximal acid plateau was negligible. However, in 1 subject there was a 30% inhibition of acid secretion and this was significant within 30-45 min, and persisted for the remainder of the test. In another, there was a significant 30% increase of acid output which occurred after the smoking period and was maintained for the remainder of the test. In the 54 tests there was a slight increase in 30-min pepsin outputs, but this was significant in the single subject who had a positive acid output response.

1907 PAIN AND GASTRIC ACID SECRETION. (E.) Kehoe, M. (U. Florida Coll. Med., Gainesville). *J. Psychosom. Res.* 15(1):47-53, 1971.

The effect of spontaneous experiences of pain on gastric secretion was studied in 9 healthy human volunteers by using hypnosis to evoke depressive responses. Spontaneous pain was reported in 107 instances. Pain was associated with a lower secretory rate of total acid in 86 instances, and with a higher rate of secretion on 21 occasions. The group mean secretory rate of total acid coincident with pain was 0.024 mEq/min, and was 0.054 mEq/min with no pain; this difference was significant. Body stiffness was reported 27 times. As with "pain," the secretory rate of total acid coincident with a report of "stiffness" was lower in 19 of the 27 cases. The group mean secretory rate of total acid associated with "stiffness" was 0.017 mEq/min, and was 0.039 mEq/min with no stiffness; again, this difference was significant.

1908 RELATIONSHIP OF AMINOPYRINE CLEARANCE TO GASTRIC SECRETION AFTER FEEDING AND FEEDING PLUS FAT. (E.) Bochenek, W., J. F. Long and J. A. Balint (Albany Med. Coll., N. Y.). *Am. J. Physiol.* 220(4):945-948, 1971.

The relationship of aminopyrine clearance from the gastric mucosal circulation to gastric acid and pepsin secretion was studied in 4 dogs with vagally denervated gastric pouches following a meat meal or following a meat meal plus peanut oil infused directly into the duodenum for 60 min, starting 30 min after feeding. The clearance of aminopyrine from the gastric circulation paralled gastric acid secretion in the feeding experiments and in the feeding-plus-fat experiments, except during the time periods immediately after feeding and the collection periods after fat-induced inhibition of gastric secretion. The clearance of aminopyrine increased prior to increased gastric secretion after the period of inhibition, suggesting either that an independent mechanism exists for increasing mucosal blood flow or that increased mucosal blood flow is a result of metabolic activity which precedes observable increases in gastric secretion. The ratios of aminopyrine concentrations in gastric juice and blood plasma were elevated during the time of fat inhibition of gastric secretion, indicating that the primary effect is on gastric secretion and not a limitation of blood flow to the gastric mucosa.

1909 RADIOIMMUNOASSAY OF GASTRIN. THE RESPONSE OF SERUM GASTRIN TO INSULIN HYPOGLYCAEMIA. (E.) Korman, M. G., C. Soveny and J. Hansky (Prince Henry's Hosp., Melbourne, Australia). *Scand. J. Gastroenterol.* 6(1): 71-75, 1971.

Serum gastrin response was studied in 6 controls and 23 patients (12 males, 11 females, ages 8-76 yr) undergoing growth hormone analysis with insulin hypoglycemia. Patients included 10 with growth retardation, 5 with acromegaly, 4 with cerebral aneurysms, 1 with hypoglycemia, and 3 who had undergone hypophysectomy for acromegaly. Blood samples were taken i.v. for determination of gastrin and sugar levels 30 min before, just before, and 20-120 min after i.v. injection of 0.1 units/kg of soluble insulin. The gastrin concentration in 0.5 ml of serum was determined in duplicate by immunoassay. Time course studies showed that serum gastrin and blood sugar levels were inversely related. Although the degree of hypoglycemia for both groups was identical after treatment, gastrin levels were increased in 13 and unchanged in 16 subjects in response to insulin. Only the growth retardation group showed a significant gastrin response to insulin. It is concluded that the variations between subjects are due to certain factors which prevent vagal release of gastrin.

1910 DUODENAL MECHANISMS FOR INHIBITION OF GASTRIC ACID SECRETION IN THE DOG. (E.) Konturek, S. J. (Med. Acad. Inst. Physiol., Cracow, Poland), J. Tasler and W. Obtulowicz. *Am. J. Physiol.* 220(4):918-921, 1971.

Half-maximal gastric acid response to pentagastrin (2 μg/kg/hr) was studied in 10 dogs with surgically created chronic gastric and pancreatic fistulas, Pavlov pouches, and intestinal loops from various portions of the small bowel. After acid output reached a plateau, either 0.1 N HCl was instilled into 1 of the intestinal loops or secretin was infused i.v. in doses producing an equivalent rate of pancreatic bicarbonate output. Perfusion of the innervated duodenal bulb loop with acid caused a 75% inhibition of acid output from the Pavlov pouch, and a small increase in the bicarbonate output from the pancreatic fistula. Secretin in a dose (0.05 μg/kg/hr) causing an equal rate of pancreatic bicarbonate secretion did not result in any change in gastric acid secretion. Perfusion of the duodenojejunal loop with acid resulted in a 70% inhibition of gastric secretion and an increase of pancreatic secretion to 25% of the maximal response to secretin. Secretin caused a 50% inhibition of gastric secretion. Acid perfusion of the jejunal loop (75 cm distal to the ligament of Treitz) resulted in a slight increase of both gastric and pancreatic secretion; acidification of the distal jejunal and ileal loops had no effect on gastric or pancreatic secretion. These studies indicate 2 inhibitory mechanisms initiated by acid are functional in the duodenum; they are a secretin-dependent and a secretin-independent mechanism located mostly in the duodenal bulb.

1911 GASTRIC AND PANCREATIC RESPONSE TO ACID IN THE DUODENUM AFTER PARTIAL DUODENECTOMY. (E.) Way, L. W. (VA Ctr., Los Angeles, Calif.) and M. I. Grossman. *Am. J. Physiol.* 220(4):1016-1019, 1971.

In dogs with Heidenhain pouches and gastric and pancreatic fistulas, gastric secretion was stimulated by continuous i.v. infusion of pentagastrin (4 μg/kg/hr). When secretion reached a plateau, either the gastric fistula was closed, causing acid from the main stomach to enter the duodenum, or secretin (0.5 units/kg/hr) was administered i.v. Inhibition of acid secretion from the Heidenhain pouch and stimulation of pancreatic secretion from the pancreatic fistula were measured. The studies were repeated after the surgical excision of the first 5 cm of the duodenum (from pylorus to entry of the bile duct). Both before and after excision of the duodenal segment, closing the gastric fistula or infusion of secretin increased pancreatic bicarbonate secretion and decreased gastric acid secretion to the same degree; this suggests that secretin accounted for most of the inhibition of acid secretion by duodenal acidification. The small changes produced by duodenal excision suggest that this part of the gastrointestinal tract may produce an inhibitor other than secretin.

1912 STUDIES ON THE EFFECT OF HEMICHOLINIUM-3 ON GASTRIC ACID SECRETION IN THE ISOLATED BULLFROG GASTRIC MUCOSA WITH SPECIAL REFERENCE TO THE MODE OF ACTION OF GASTRIN-LIKE TETRAPEPTIDE. (E.) Watanabe, K. (Nagoya City U. Fac. Pharmaceut. Sci., Japan), Y. Goto and H. Fukuda. *Jap. J. Pharmacol.* 20(4):600-603, 1970.

Gastric mucosa of the bullfrog was isolated to study the effects of hemicholinium No. 3 (α,α'-dimethylethanolamino-4,4'-biacetophenone) on gastric acid secretion and its action on histamine, bethanechol, and gastrin-like tetrapeptides. Hemicholinium No. 3 (1×10^{-4} g/ml-5×10^{-3} g/ml) inhibited basal acid secretion, and the degree of inhibition was dose-dependent. Hemicholinium treatment almost abolished the secretagogue action of gastrin-like tetrapeptide. Treatment with hemicholinium No. 3 did not affect the action of histamine or bethanechol. Acetylcholine synthesis seems to be an important factor in the secretagogue action of gastrin-like tetrapeptide.

1913 INDUCTION OF TRANSCRIPTION IN THE STIMULATING ACTION OF A GASTRIN PENTAPEPTIDE ON GASTRIC ACID SECRETION. (E.) Salganik, R. I. (Inst. Cytol. Genet., Novosibirsk, USSR), S. V. Argutinskaya and R. I. Bersimbaev. *Experientia* 27(1):53-54, 1971.

The effect of pentagastrin, histamine, and aurantin (an actinomycin analogue) on gastric acid secretion was studied in rats to determine if pentagastrin exerts its effect by switching on or by enhancing the transcription of a definite DNA region. Injection of pentagastrin (0.4 μg/100 g body weight) at 20-min intervals augmented basal gastric secretion 2-3 times. When aurantin was injected in a dose of 100 μg/100 g body weight 30 min before the first pentapeptide injection, and followed by a further dose of 50 μg/100 g body weight 1 hr later, the pentagastrin had no significant effect, although the basal secretion of acid was not affected. Aurantin injection could not inhibit the positive effect of histamine (200 μg/g body weight) on gastric acid secretion. RNA synthesis in the gastric mucosa was increased by pentapeptide, but not by histamine. The physiological effect of pentapeptide seems to involve DNA-dependent RNA and protein synthesis, while histamine stimulates acid secretion in some other way.

1914 INHIBITORY EFFECTS OF A PURIFIED ENTEROGASTERONE, SECRETIN, AND CHOLECYSTOKININ ON HISTAMINE-STIMULATED GASTRIC ACID SECRETION. (E.) Lucien, H. W. (VA Hosp., New Orleans, La.), Z. Itoh and A. V. Schally. *Gastroenterology* 59(5):707-711, 1970.

In dogs with Heidenhain pouches, enterogastrone (0.5 and 2.0 mg i.v.) inhibited gastric acid secretion by (18% and 35%, resp.); however, secretin or cholecystokinin did not inhibit gastric secretion in the experimental dogs. Cecekin, a crude preparation of cholecystokinin, inhibited histamine-stimulated gastric secretion at a dose of 20 Ivy dog units. Since fat in the duodenum inhibits gastric acid secretion stimulated by histamine, and the above enterogastrone-like substance is of duodenal origin (free of secretin and cholecystokinin contamination), this substance may be the humoral agent responsible for the inhibition of histamine-stimulated gastric secretion by fat.

1915 THE EFFECT OF SECRETIN ON GASTRIC EMPTYING IN MAN. (E.) Vagne, M. (Natl. Inst. Health Med. Res., Lyon, France) and C. Andre. *Gastroenterology* 60(3):421-424, 1971.

The process of gastric emptying was observed in 2 healthy subjects during continuous infusion of saline and 3 different doses of secretin (0.125, 0.395, and 1.250 units/kg/hr). The volume of meal remaining in the stomach increased with increased doses of secretin and was related to the logarithm of the dose. Acid concentration and output were lower during secretin infusion than during saline infusion. However, the decrease for acid output was significant only for the largest dose of secretin. Increasing acid concentration during saline infusion produced an increase in gastric emptying. However, for the same acid concentration and in the same subject, the volumes of meal remaining in the stomach during secretin infusion were statistically higher than during saline infusion. Therefore, it appears that secretin does not act only by inhibiting gastric acid secretion, but probably also by decreasing gastric motility.

1916 EFFECT OF GASTRIC VAGAL DENERVATION ON INHIBITION OF ACID SECRETION BY SECRETIN. (E.) Brooks, A. M., F. Stening and M. I. Grossman (VA Ctr., Los Angeles, Calif.). *Am. J. Dig. Dis.* 16(3):193-202, 1971.

The efficacy of secretin as an inhibitor of acid secretion from gastric pouches before and after local vagotomy was studied in dogs. Vagal denervation markedly increased the pouch acid output in response to 0.025 mg/kg/hr of bethanechol (a 291% increase), and moderately augmented the response to 0.1 mg/kg/hr of bethanechol (52%). Acid output from the gastric fistula was not significantly altered by vagal denervation of the pouch. Secretin inhibited acid output by 42% in the Pavlov pouch and by 52% in the Heidenhain pouch. Duodenal acidification resulted in an inhibitory pattern comparable to that elicited by exogenous secretin. Vagal denervation reduced peak acid output from the pouch by 47% when pentagastrin was the stimulant. Secretin strongly inhibited pentagastrin-stimulated acid output in both Pavlov and Heidenhain pouches (63% and 73%, resp.). Vagal denervation also reduced peak acid output from the pouch by 40% when food was the stimulant. Secretin produced a marked decrease (71%) in food-stimulated acid output in the Heidenhain pouch.

1917 THE INFLUENCE OF MESENTERIC DENERVATION ON THE INHIBITION OF GASTRIC SECRETION BY FAT IN THE INTESTINE. (E.) Isaza, J. (U. Florida Coll. Med., Gainesville), K. Sugawara, J. Curt and E. R. Woodward. *Gut* 12(1):34-39, 1971.

The effect of fat (olive oil) in the jejunum on gastric secretion was studied in dogs with a gastric fistula, jejunal fistula, or a Heidenhain pouch. The olive oil emulsion significantly inhibited the pentagastrin-stimulated secretion of both a vagally-innervated gastric fistula and a vagally-denervated Heidenhain pouch. The degree of inhibition averaged 69.7% in the gastric fistula and 50% in the Heidenhain pouch, and the effect usually lasted for 90 min. Following mesenteric denervation, the gastric fistula secretion was inhibited by 23.5% and the Heidenhain pouch secretion by 40%. Mesenteric denervation also caused significant increase in 24-hr collections from the Heidenhain pouch. Efferent inhibitory vagal fibers to the stomach may act synergistically with enterogastrone.

1918 THE EFFECT OF SPLANCHNIC NERVE STIMULATION ON GASTRIC ACID SECRETION AND MUCOSAL BLOOD FLOW IN THE ANAESTHETIZED CAT. (E.) Reed, J. D. (Univ. Med. Sch., Newcastle upon Tyne, England), D. J. Sanders and V. Thorpe. *J. Physiol. (Lond.)* 214(1):1-13, 1971.

The effects of vagal stimulation and inhibition and splanchnic stimulation on mucosal blood flow and acid secretion were studied in starved cats to clarify the role of the splanchnic nerves in gastric function. During the first 70 min of prolonged vagal stimulation, the secretory and circulatory responses increased progressively and subsequently remained relatively constant. Prolonged splanchnic nerve stimulation produced marked reductions in the vagal-stimulated acid secretion and mucosal blood flow. Guanethidine (3 mg) increased acid output and mucosal blood flow. Splanchnic nerve stimulation also produced a marked reduction in the pentapeptide-induced increases in percent acid secretion and mucosal blood flow; these inhibitions were similar when the rise in blood pressure normally associated with splanchnic stimulation was prevented. Stimulation of splanchnic nerves in adrenalectomize animals yielded similar results, indicating that the effect was not mediated by the release of epinephrine from the adrenal medulla.

1919 EXCRETION OF ^{3}H-HISTAMINE IN URINE OF RATS WITH PORTACAVAL SHUNTS. (E.) Kowalewski, K. (U. Alberta Surg.-Med. Res. Inst., Edmonton, Canada), J. C. Russell and A. Koheil. *Proc. Soc. Exp. Biol. Med.* 136(3):761-764, 1971.

Twelve female Wistar rats with end-to-side portacaval shunts and 11 sham-operated rats received ^{3}H-L-histidine (1.6 mg/kg body weight, i.v.) 20 days after surgery; urine was collected for four 24-hr periods and analyzed for ^{3}H-L-histamine by the method of Schayer. The excretion of ^{3}H-histamine was lower in the shunted rats than in the controls. The increased urine output noted in shunted rats as compared with the controls is unexplained. These results deny the hypothesis of an increased synthesis and excretion of histamine in animals with portacaval shunts.

1920 STUDIES ON ADENYL CYCLASE IN Necturus GASTRIC MUCOSA. (E.) Nakajima, S. (U. Alabama Sch. Med., Birmingham), B. I. Hirschowitz and G. Sachs. *Arch. Biochem. Biophys.* 143(1):123-126, 1971.

The measurement of the amount of radioactive 3',5'-cyclic AMP formed from ^{3}H-labeled ATP was used to determine adenyl cyclase activity of Necturus gastric mucosa. Adenyl cyclase activity was significantly increased by histamine (10^{-3} M) and sodium fluoride (10^{-2} M), and to a lesser extent by pentagastrin (5.0×10^{-6} M). Production of cyclic 3',5'-AMP, a reflection of adenyl cyclase activity, was reduced by the administration of N-benzyl-3-pyrrolidyl acetate methobromide (AHR-602), a muscarinic compound. Since dose-response curves revealed that combination of maximal doses of pentagastrin and histamine do not produce additive effects on adenyl cyclase activity, gastric mucosa probably contains a single adenyl cyclase unit which is coupled to distinctive selectivity sites for pentagastrin and histamine. Since AHR-602 caused a significant reduction of adenyl cyclase activity, there must be a different mechanism for the stimulation of gastric acid secretion by cholinergic muscarinic compounds.

1921 ANALYSIS OF GASTRIC SECRETION. (Ger.) Ottenjann, R. (German Diagn. Clin., Wiesbaden). *Dtsch. Med. Wochenschr.* 95(45): 2307, 1970.

1922 STUDY OF GASTRIC SECRETORY ACTIVITY. (Rus.) Vafin, A. Z. (Med. Inst., Krasnodar, USSR). *Fiziol. Zh. SSSR* 56(11): 1619-1626, 1970.

1923 EFFECTS OF RESERPINE AND HISTAMINE ON ACID SECRETION AND GASTRIC MUCOSAL BLOOD FLOW IN ANESTHETIZED DOGS. (Sp.) Chacin Melean, J. (U. Zulia Sch. Med., Maracaibo, Venezuela), P. Diaz and J. Colina. *Acta Cient. Venez.* 21(3):98-101, 1970.

1924 THE EFFECT OF UROGASTRONE ON GASTRIC ACID SECRETION IN DOGS AND CATS. (E.) Gerring, E. L. (ICI Ltd. Pharmaceut. Div., Macclesfield, England) and E. Haworth. *R. C. Rom. Gastroenterol.* 2(3):167-171, 1970.

1925 THE ACTION OF CAERULEIN ON GASTRIC SECRETION OF THE INTRINSIC FACTOR IN THE RAT. (E.) Melchiorri, P. (U. Rome Inst. Med. Pharmacol.) and N. Sopranzi. *Pharmacol. Res. Commun.* 2(2):135-142, 1970.

1926 METABOLISM OF PROSTAGLANDIN F$_{1\alpha}$ BY THE RAT STOMACH. (E.) Pace-Asciak, C. (McGill U. Neurol. Inst., Montreal, Canada), K. Morawska and L. S. Wolfe. *Biochim. Biophys. Acta* 218(2):288-295, 1970.

1927 ON THE MECHANISM OF ACTION OF CHOLECYSTOKININ (CCK): EFFECT ON PHOSPHODIESTERASE (PDE). (E.) Amer, M. S. (Mead Johnson Res. Ctr., Evansville, Ind.) and G. R. McKinney. *Pharmacologist* 12(2):291, 1970.

1928 EFFECT OF KININ HORMONES ON GASTRIC SECRETION. IV. EFFECT OF THE PROTEASE INHIBITOR, TRASYLOL. (Ger.) Mertz, D. P. (Univ. Med. Polyclin., Freiburg/Br., Germany) and W. Poppe. *Med. Klin.* 66(13):469-473, 1971.

1929 PROTEIN HYDROLYSIS IN THE STOMACH AFTER THE DISCOVERY OF THE NEW PROTEOLYTIC ENZYMES. (Ger.) Buchs, S. (Univ. Pediatr. Clin., Basel, Switzerland). *Dtsch. Med. Wochenschr.* 96(12):511-517, 1971.

1930 DOSE-RESPONSE STUDIES OF GASTRIC SECRETION OF SODIUM, POTASSIUM, CALCIUM, INORGANIC PHOSPHORUS, AND MAGNESIUM AFTER STIMULATION WITH PENTAGASTRIN. (E.) Christiansen, J. (Natl. Hosp., Copenhagen, Denmark) and P. Aagaard. *Scand. J. Gastroenterol.* 5(7):609-612, 1970.

1931 POTASSIUM IN GASTRIC JUICE. (E.) Witten, T. A. (VA Hosp., Denver, Colo.) and J. G. Bickel. *Gastroenterology* 59(2):330-332, 1970.

See also numbers: 1862, 2048, 2219, 2270

1932 INTRACELLULAR DISTRIBUTION OF PHOSPHOLIPASES IN THE RAT PANCREAS. (E.) Arnesjö, B. (U. Lund Chem. Ctr., Sweden). *Acta Physiol. Scand.* 81(2):170-175, 1971.

Intracellular distribution of free and potential phospholipase A activities in the rat pancreas was studied by isopycnic gradient centrifugation of pancreatic homogenates. The β-fatty acid ester-splitting activity was distributed as 30% and 50% between the zymogen and membrane-cell sap fractions, resp. The specific activity of the fatty acids released by the zymogen granule fractions indicated that about 70% of the activity responsible for the hydrolysis of micellar lecithin at pH 9 was of the phospholipase A^2 type. Only 50% of the activity present in the membrane-cell sap fractions was calculated to be due to a phospholipase A^2 activity. The predominant activity splitting the α-fatty ester linkage of lecithin was of the lysophosphatidase type. After digestion with trypsin, pancreatic phospholipase A activity was increased approximately 20-fold; this increase was highest in membrane-cell sap fractions. Phospholipase was distributed more towards the membrane-cell sap fractions than lipase, but the percentages in the zymogen granule fractions were similar.

1933 GASTRIC BYPASS AND PANCREATIC SECRETION. (E.) Ito, C. (U. Hokkaido Sch. Med., Sapporo, Japan) and E. E. Mason. *Surgery* 69(4): 526-532, 1971.

Pancreatic secretion in 20 dogs with gastric bypass was studied before and after transthoracic vagotomy or restoration of gastric continuity without transthoracic vagotomy. Gastric bypass (70%) caused a 40% decrease in pancreatic enzyme secretory response to feeding; this is evidence that gastrin and, perhaps, pancreozymin secretion are decreased due to inhibition of acid secreted in the excluded stomach segment and due to diversion of food away from the antrum and duodenum. Division of branches of the vagal nerves in the wall of the transected stomach was not a factor in the decrease in pancreatic enzyme secretion. Pancreatic bicarbonate was not significantly decreased by gastric bypass, indicating that some acid enters the duodenum and stimulates secretin release. The decrease of pancreatic enzyme secretion after gastric bypass is similar to that observed after gastric resection, and should not lead to malnutrition in most patients.

1934 EFFECT OF VAGOTOMY ON PANCREATIC SECRETION STIMULATED BY ENDOGENOUS AND EXOGENOUS SECRETIN. (E.) Moreland, H. J. (U. Oklahoma Sch. Med., Oklahoma City) and L. R. Johnson. *Gastroenterology* 60(3):425-431, 1971.

Three dogs were prepared with chronic gastric, duodenal, and pancreatic fistulas. Vagotomy resulted in a significant decrease in volume and bicarbonate output of pancreatic secretion in response to duodenal instillation of 1.5 and 6.0 mEq HCl/hr; this effect was maximal with 1.5 mEq/hr, and was not significant with 24.0 mEq/hr. Vagotomy alone had no effect on these 2 parameters, but did decrease the basal output of pancreatic protein, in a manner varying indirectly with dose. There was a significant decrease in volume and bicarbonate output when vagotomy was combined with low doses (0.5-1.0 units/kg/hr), but not with high doses (2.0 and 4.0 units/kg/hr), of secretin. This decrease in basal protein output indicates that the vagus nerve may directly influence the stimulation of enzyme secretion in the pancreas.

1935 VAGAL STIMULATION OF THE EXOCRINE PANCREAS. (E.) Eisenberg, M. M. (Mt. Sinai Hosp., Minneapolis, Minn.) and R. C. Orahood. *Ann. Surg.* 173(3):462-466, 1971.

The effect of 2-deoxy-D-glucose (2-DG) (100 or 200 mg/kg), insulin (0.5 or 1.5 units/kg), and histamine dihydrochloride (3.0 mg/hr) on pancreatic and gastric secretion was studied in 3 dogs with pancreatic and gastric fistulas. Insulin and 2-deoxy-D-glucose were strong stimuli of pancreatic enzyme protein, but only weakly stimulated pancreatic bicarbonate secretion with the gastric fistula open for measurement. When the gastric fistula was closed, protein output was further augmented by 2-deoxy-D-glucose and insulin and strongly stimulated by histamine. All 3 compounds caused an increase in bicarbonate output. The 2-deoxy-D-glucose is seemingly as potent a vagal stimulator of pancreatic secretion as insulin, and vagal stimulation seems to have its primary effect on enzyme secretion. Acid in the duodenum (measured with a closed fistula) further augmented vagally-stimulated enzyme and bicarbonate output.

1936 CHYMOTRYPSIN INHIBITOR STIMULATION OF PANCREATIC ENZYME SECRETION IN THE RAT. (E.) Green, G. M. (U. California Dept. Nutr. Sci., Berkeley) and R. L. Lyman. *Proc. Soc. Exp. Biol. Med.* 136(2):649-654, 1971.

Long-Evans rats were fasted for 24 hr and were then administered (by nasogastric tube) either a basic diet plus 25 mg/100 g of potato chymotrypsin inhibitor or a basic diet plus 42 mg/100 g soybean trypsin inhibitor; controls received a basic diet plus 50 mg/100 g of purified casein; and a 4th group was not fed after the 24-hr fast, and was used to establish fasting levels of enzymes assayed. The last group was sacrificed immediately after the 24-hr fast, while the first 3 groups were sacrificed 2, 4, 6, and 8 hr after administration of the test materials; the pancreases were removed, frozen, lyophilized, and homogenized. Intestinal contents were also removed for assay. By 2 hr after feeding, pancreatic trypsin and chymotrypsin activities in rats receiving soybean trypsin inhibitor were significantly less than 40% of control values. Maximum depletion occurred between 2-6 hr, when these activities were only 14% on the control values. By 8 hr, the pancreases were repleted. Lipase activity followed essentially the same pattern, except for some irregularity in the 6-hr controls. The pancreatic response to potato chymotrypsin inhibitor was not nearly as pronounced as with the other enzyme inhibitors, and the time of maximal depletion was delayed. The lipase activity of intestinal contents was greatly increased in animals receiving the soybean inhibitor and, to a lesser extent, potato inhibitor. Intestinal trypsin activity in soybean inhibitor-treated rats and chymotrypsin activity in potato inhibitor-fed rats were much less than in controls. There was a significant increase in chymotrypsin activity in the intestine of soybean inhibitor-fed rats.

1937 INFLUENCE OF SECRETIN-CHOLECYSTOKININ AND SECRETIN-PENTAGASTRIN ON PANCREATIC SECRETION OF GLYCOSIDASES. (E.) Desbaillets, L. (U. Chicago Sch. Med., Ill.), W. C. McMaster and R. Menguy. *Proc. Soc. Exp. Biol. Med.* 136(2):597-600, 1971.

Effects of secretin-cholecystokinin and secretin-pentagastrin on pancreatic secretion of β-N-acetyl-D-glucosaminidase, β-N-acetyl-D-galactosaminidase, α-D-mannosidase and α-L-fucosidase was studied in dogs with duodenal fistulas. The output of all 4 glycosidases in pancreatic juice increased during pancreatic stimulation by both secretin-cholecystokinin and by secretin-pentagastrin. In both cases the magnitude of the response was similar to that of trypsinogen and amylase. Analysis of the dose-response curves of the percentage increase in enzyme output as a function of log dose of cholecystokinin demonstrated a significantly linear slope for all enzyme systems studied. The log dose-response relations of the 4 glycosidases were similar to those of trypsinogen and amylase.

1938 IN VITRO AND IN VIVO EFFECTS OF PANCREOZYMIN, URECHOLINE, AND CYCLIC AMP ON RAT PANCREAS. (E.) Morisset, J. A. (VA Hosp., Atlanta, Ga.) and P. D. Webster. *Am. J. Physiol.* 220(1):202-208, 1971.

Effects of pancreozymin, bethanecol and cyclic AMP on rat pancreatic secretion was studied using in vivo and in vitro models. In vivo administration of pancreozymin or bethanecol was associated with increased pancreatic protein synthesis and secretion. In vivo administration of dibutyryl cyclic AMP (25.0 mg/kg s.c.) caused an initial depression, followed by a slight increase, in amylase secretion. All 3 compounds caused increased amylase secretion in vitro; however, none were associated with increased protein synthesis.

1939 SECRETION OF HYDROLASES BY PERFUSED FRAGMENTS OF RAT PANCREAS: EFFECT OF CALCIUM. (E.) Robberecht, P. (Brussels U. Sch. Med., Belgium) and J. Christophe. *Am. J. Physiol.* 220(4):911-917, 1971.

The in vitro secretion of lipase and amylase was studied using perfused rat pancreas fragments. A Krebs-Ringer bicarbonate buffer enriched with 10 mM glucose was used as the perfusate (20 ml/hr). Since the perfused pancreas rapidly lost its active trypsin inhibitor, autolysis was prevented by the addition of Trasylol. A steady rate of lipase and amylase secretion of 3.8%/hr was noted during the 2nd hr. By deleting calcium from the perfusate, a reversible depression of the basal secretion by 2/3 was noted during the 2nd hr. Excess magnesium was slightly antagonistic to calcium. Barium could not be substituted for an equal concentration of calcium. Carbachol had an excitant action at a low dose (5×10^{-6} M), but was inhibitory at higher doses. After a preincubation period of 60 min, lipase and amylase secretion were stimulated to the same extent by carbachol (5×10^{-6} M) and by pancreozymin (30 Crick units/liter). The absolute secretory response to both agents was decreased in the absence of calcium, but the relative response was unaffected when related on a proportional basis to the basal outflow of enzymes.

1940 DISTRIBUTION OF HYDROLASES IN THE RAT PANCREAS: SOME PROPERTIES OF THE ZYMOGEN GRANULES. (E.) Vandermeers-Piret, M. C. (Brussels U. Sch. Med., Belgium), J. Camus, J. Rathé, A. Vandermeers and J. Christophe. *Am. J. Physiol.* 220(4):1037-1045, 1971.

Density gradient centrifugation was used to study the distribution of hydrolases and the organization of zymogen granules in the rat pancreas. Tissue homogenates were centrifuged in a linear concentration gradient (0.5 M-2.0 M) of sucrose, buffered to pH 6.5. After centrifugation of the whole homogenate 60 min, isolated zymogen granules contained the same proportions of total amylase, lipase, trypsinogens 1 and 2, chymotrypsinogen, and procarboxypeptidase B, suggesting the absence of specific bypass secretion in the pancreatic exocrine cell. After preliminary elimination of cellular debris and nuclei, the granules moving along the sucrose gradient at low centrifugal force had high specific activities, and showed no preferential binding of any one hydrolase as a function of the granule size and density. The tendency of lipase to be tightly associated with granule structure, at pH 6.5, seemed specific of this type of organelle. Resuspended granules were rapidly solubulized at pH above 6.0 when incubated at 0C. These results suggest an enzymatic homogeneity of enzyme content at the level of individual granules. Supporting data was obtained from animals whose enzyme complement was altered by dietary means.

1941 SECRETION OF WATER AND ELECTROLYTES BY THE EXOCRINE PANCREAS IN PATIENTS TREATED BY CHRONIC HAEMODIALYSIS. (E.) Pascal, J. P. (CHU Purpan, Toulouse, France), J. Conte, N. Vaysse, D. Augier, H. Ton That and J. M. Suc. *Rev. Eur. Etud. Clin. Biol.* 16(1):61-65, 1971.

Functional exploration of the exocrine pancreas by continuous secretin infusion in 10 patients undergoing chronic hemodialysis for terminal renal failure showed that the secretion of water and bicarbonate was unimpaired. The main characteristics of the composition of duodenal juice in patients were hypo-osmolality, diminished concentrations of chloride and sodium, and increased concentrations of potassium; these abnormalities are accounted for by corresponding alterations in plasma electrolytes. The secretion of urea by the pancreas apparently involves mainly the process of diffusion since the content in juice and plasma tends to be about the same for smallest values of urea concentration. The fact that pancreatic response to secretin in patients undergoing chronic hemodialysis was unimpaired may be due to the restoration of the acid-base balance by the treatment. The alkaline secretory capacity of patients with renal failure, but without maintenance hemodialysis, is probably somehow depressed as a result of plasma disturbances.

1942 AN ASSESSMENT OF MODELS FOR PANCREATIC SECRETION. (E.) Makhlouf, G. M. (Med. Coll. Virginia, Richmond) and A. L. Blum. *Gastroenterology* 59(6):896-908, 1971.

Ionic and protein content of pancreatic secretion obtained from cannulated main ducts of 2 men and 3 dogs was analyzed to determine the factors involved in the final composition of the secretion. In man, there was an inverse relationship between [HCO_3] and [Cl]; however, the sum of [Cl] + [HCO_3] did not remain constant as [HCO_3] increased. A hyperbolic relation between flow rate and [HCO_3] was described by a family of 3 curves, each characterized by a narrow range of [Cl] output per sample. In dogs, an increase in [HCO_3] was associated with decreases in [Cl] and [Ca] and increases in [Na] and [K]. At all levels, a significant discrepancy was present between the sum of the cations (Na^+, K^+, and Ca^{++}) and the sum of the anions (Cl^- and HCO_3^-). Protein concentration was generally inversely related to [HCO_3]. The relation between [HCO_3] or [Cl] and flow rate was the same hyperbolic relation demonstrated in man. A 1:1 exchange ratio of Cl^- for HCO_3^-, or a unicellular model based on a constant sum of the anions, seems to be an unlikely model for pancreatic secretion in both man and dog.

1943 STRUCTURAL INVESTIGATIONS ON PANCREATIC A AMYLASE. II. DETERMINATION OF THE MOLECULAR WEIGHT BY SEDIMENTATION AND LIGHT SCATTERING. (E.) Zavodszky, P. (Inst. Biochem., Budapest, Hungary) and P. Elodi. *Acta Biochim. Biophys. Acad. Sci. Hung.* 5(2):225-229, 1970.

1944 COMPARISON OF THE MULTIPLE FORMS OF BOVINE PANCREATIC DEOXYRIBONUCLEASE. (E.) Salnikow, J. (Rockefeller U., New York, N. Y.), S. Moore and W. H. Stein. *J. Biol. Chem.* 245(21):5685-5690, 1970.

1945 SERUM ALKALINE PHOSPHATASE ACTIVITY DURING THE PANCREOZYMIN SECRETION TEST. (Cz.) Trcka, K. (Charles U. Sch. Med., Hradec Kralove, Czechoslovakia), V. Bartos and J. Krejcarova. *Lek. Zpr. Lek. Fak. Karl. Univ.* 15(9-10):267-272, 1970.

1946 SIGNIFICANCE OF PANCREATIC FUNCTION TESTS IN THE DIAGNOSIS OF DIGESTIVE FUNCTION. I. SIGNIFICANCE OF LAP AND ZINC IN THE PANCREOZYMIN SECRETION TEST. (Jap.) Ito, Y. (2nd Tokyo Natl. Hosp.), H. Shibata and H. Kashima. *Iryo* 24(8):629-634, 1970.

1947 INFLUENCE OF ACETAZOLAMIDE ON PANCREATIC SECRETION IN MAN. (E.) Dyck, W. P. (Scott and White Clin., Temple, Tex.) and N. C. Hightower. *Clin. Res.* 19(1):33, 1971.

1948 EFFECTS OF SECRETIN, PANCREOZYMIN, AND POSTERIOR HYPOPHYSEAL EXTRACTS ON THE OUTPUT AND PHOSPHOLIPASE A ACTIVITY OF PANCREATIC JUICE IN THE DOG. (Fr.) Belleville, J. (Sch. Sci., Dijon, France), J. Clement and M. Beauvallet. *J. Physiol. (Paris)* 62(Suppl. 2): 243, 1970.

1949 SECRETIN AND PENTAGASTRIN STIMULATION OF PANCREATIC AND BILIARY SECRETIONS COLLECTED FROM FISTULAS IN MAN. (Fr.) Vagne, M. (INSERM Physiopathol. Dig. Res. Unit, Lyon, France), L. Descos and J. Cuilleret. *C. R. Soc. Biol. (Paris)* 164(8-9):1762-1767, 1971.

See also numbers: 1820, 1910, 1911

1950 FORMULATION AND PHARMACOLOGICAL STUDIES OF A CONTROLLED RELEASE PENTAGASTRIN INJECTION. (E.) Wai, K. N. (Imperial Chem. Indust. Ltd., Cheshire, England), E. E. L. Gerring and R. D. Broad. *J. Pharm. Pharmacol.* 22(12):923-929, 1970.

Four preparations of pentagastrin were used for *in vitro* and *in vivo* studies in dogs of controlled release after s.c. injection. The *in vitro* diffusion across a dialysis membrane into phosphate buffer at pH 7.3 showed that the 2 solutions obeyed Fick's Law, while the 2 crystalline preparations showed an initial period of constant release rate. One crystalline preparation's pattern is thought to be due to the combined effect of dissolution and diffusion, with the former dominating the initial stage. With resultant data, release rates were calculated to range from 2.4-11.7 μg/min. With s.c. injection of ^{14}C-labeled solutions, the total ^{14}C excreted into the bile of rats showed close approximations to the biliary excretion rate by analog computer, while the 2 crystalline preparations failed to obey first-order kinetics. The observed secretory response demonstrated that maximum secretion can be sustained by control of the rate of release of short-acting drugs.

1951 SELECTIVE DEMONSTRATION OF THE LIVER SINUSOIDAL ENDOTHELIUM BY MEANS OF A HISTOCHEMICAL REACTION FOR PHOSPHOENOLPYRUVATE PHOSPHATASE ACTIVITY. (E.) Sandström, B. (U. Uppsala Dept. Human Anat., Sweden). *Acta Morphol. Neerl. Scand.* 8(3):195-198, 1971.

Histochemical studies were performed on liver specimens from various animals and man in order to selectively demonstrate sinusoidal epithelium. Staining was confined to the sinusoidal endothelium, where it seemed to be localized near the liver cell nuclei. The optimum pH was 5.5-6.0 for this procedure. Staining was produced only in the presence of cobalt and lead. Lead or cobalt alone gave negative results, as was the case when cobalt was replaced by 5 mM Mg^{++}, 5 mM Mn^{++}, or 160 mM Na^{+} salts. No staining at this particular localization was noted when phosphoenolpyruvate was replaced by other substances including nucleoside diphosphates, triphosphates and glucose-6-phosphate and fructose-1,6-diphosphate. The apparent substrate specificity definitely rules out nonspecific acid phosphatase activity, which otherwise might be prominent in the endothelial cells. Since only the nuclei of the sinusoidal cells, and not the parenchymal cells, were stained, diffusion is less probable. The selective staining may be due to an enzymatic dephosphorylation of phosphoenolpyruvate.

1952 ACTION OF METABOLIC HORMONES ON THE FINE STRUCTURE OF RAT LIVER CELLS. I. EFFECTS OF FASTING ON THE ULTRASTRUCTURE OF HEPATOCYTES. (E.) Cardell, R. R., Jr. (U. Virginia Sch. Med., Charlottesville). *Am. J. Anat.* 131(1):21-53, 1971.

The smooth endoplasmic reticulum, the rough endoplasmic reticulum, and glycogen were the most responsive cellular components of liver cells to the effects of fasting for 2 through 40 hr. After a 2-hr fast, glycogen appeared as discrete masses (closely-packed alpha particles of glycogen) located throughout the cytosome; smooth endoplasmic reticulum was rarely found, and the rough endoplasmic reticulum was displayed as parallel cisternae comprising the characteristic basophilic bodies of the liver cells. As fasting was prolonged (15-40 hr), glycogen masses dssappeared, presumably due to the gradual breakdown of the glycogen particles, and were replaced by glycogen areas in the cytoplasm. Smooth endoplasmic reticulum in the hepatic parenchymal cell was dramatically increased during the prolonged fast; the tubules of this organelle were continuous with cisternae of rough endoplasmic reticulum and extended deep into the glycogen areas of the liver cells. Smooth endoplasmic reticulum may possibly develop from rough endoplasmic reticulum, and its membranes possibly provide a site for the location of enzymes involved in glycogen metabolism.

1953 THE DEVELOPMENTAL FORMATION OF ASPARAGINASE IN LIVER AND ITS DISTRIBUTION IN RAT TISSUES. (E.) McGee, M. (Harvard Med. Sch., Boston, Mass.), O. Greengard and W. E. Knox. *Enzyme* 12(1):1-12, 1971.

Assay of crude preparations of rat liver and other tissues showed that normal adult liver contained far more asparaginase than any other rat tissue tested, and only this organ exhibited a significant sex difference. Activity was twice as high in adult female liver as in male liver, and the difference developed after the 50th postnatal day. Asparaginase activity of spleen, lung, and all the fetal and neoplastic tissues tested was insignificant. Asparaginase became detectable a few hr after birth, and rose rapidly during the ensuing days; 50% of the adult value was reached by 5 days. After 20 days, both males and females reach about 90% of the value found in adult male livers. In very young rats, 24 hr of starvation (24 hr of absence from the mother) arrested the accumulation of asparaginase. In postnatal rats, an injection of hydrocortisone enhanced the developmental formation of liver asparaginase; the increase in 8-10-day-old rats was more spectacular than that seen in 1-day-old rats. The 1st phase of accumulation of rat liver asparaginase was apparently related to nursing. Adrenocortical secretion, known to increase after the 10th postnatal day, promoted the 2nd phase of accumulation of this enzyme.

1954 HEPATIC METABOLISM AND TRANSPORT IN THIAMINE DEFICIENCY. (E.) Schenker, S. (Vanderbilt U. Med. Sch., Nashville, Tenn.), D. Chen, V. Speeg, Jr., C. O. Walker and D. W. McCandless. *Am. J. Dig. Dis.* 16(3):255-264, 1971.

Liver metabolism and ATP stores, and the transport of ^{131}I-labeled Rose Bengal across the liver, were studied in symptomatic, thiamine-deficient Sprague-Dawley rats and in asymptomatic pair-fed littermate controls. In the thiamine-deficient rats, the serum activities of hepatic transketolase and pyruvate decarboxylase were significantly decreased by 89% and 74%, resp. Serum concentrations of hepatic coenzyme A and ATP were also significantly decreased by 21% and 12%, resp. However, in thiamine-deficient rats, there was no abnormality of liver morphology or of transport of labeled Rose Bengal. The *in vivo* response of pyruvate decarboxylase activity and ATP concentration to administration of exogenous thiamine was much slower in the liver than in the brain, heart, or kidney. The *in vitro* response of hepatic pyruvate decarboxylase to exogenous thiamine pyrophosphate was much more rapid.

1955 FURTHER STUDIES ON THE ROLE OF BILE SALTS IN CHOLESTEROL ESTERIFICATION AND ABSORPTION FROM THE GUT. (E.) Gallo-Torres, H. E. (Hoffmann-La Roche Co. Dept. Vitamin Nutr. Res., Basel, Switzerland), O. N. Miller and J. G. Hamilton. *Arch. Biochem. Biophys.* 143(1):22-36, 1971.

The effect of conjugated and unconjugated bile salts on the appearance of 4-^{14}C-cholesterol in the lymph was studied in female rats to determine the amount of bile salt required to produce the "critical micellar concentration" which facilitates absorption and esterification of cholesterol. The critical micellar concentration of taurocholate was produced by the administration of 225 mg or more of bile salt. When bile salts were combined in various proportions to make a total of 250 mg, absorption was not enhanced. Taurocholate was the most effective bile salt in aiding cholesterol absorption, while glycine conjugates were less effective than the corresponding taurines. Of the cholesterol found in the lymph, 65-75% was esterified following the administration of 3α, 7α,12α-trihydroxy-5β-unconjugated and conjugated bile salts. Only 50% of the cholesterol in lymph was esterified after 3α, 12α-dihydroxy-5β- and 3α,7α-dihydroxy-5β-conjugated bile salts, although they did activate the absorption mechanism. Certain specific conjugated bile salts seem to be required by the mucosal cells during the synthesis of cholesterol esters and these bile salts seem to play a role in chylomicron formation. Entirely different mechanisms may exist for the passage of free cholesterol and of cholesterol esters from the intestinal lumen into the lymph.

1956 CANALICULAR BILE FLOW AND BILE SECRETORY PRESSURE. EVIDENCE FOR A NON-BILE SALT DEPENDENT FRACTION IN THE ISOLATED PERFUSED RAT LIVER. (E.) Boyer, J. L. (Yale U. Sch. Med., New Haven, Conn.) and G. Klatskin. *Gastroenterolog* 59(6):853-859, 1971.

Infusions of saline and sodium taurocholate or sodium dehydrocholate were alternated in isolated perfused rat liver preparations to determine the relationship between bile salt secretion, bile flow, and bile secretory pressure. The rate of bile flow rose as secretion of bile salts increased however, the average flow in the virtual absence of bile salt secretion was almost half that found at rates of bile salt secretion as high as 70-100 μmoles/min/g of liver. Substitution of saline for taurocholate was associated with a 95% decrease in the concentration of bile salt in bile. The average bile flow decreased only 31%. Bile secretory pressure was not affected by either of these changes. When bile flow was increased 2-to 3-fold above control levels by infusing sodium dehydrocholate at a rate of 80 μ moles/hr, the maximum increment in bile secretory pressure was always less than 1.5 cm. A linear relationship between ^{14}C-mannitol clearance and bile flow was observed. The bile produced by the isolated perfused rat liver seems to be mainly canalicular in origin.

1957 INSIGNIFICANCE OF THE ENTEROBILIARY CIRCULATION OF LECITHIN IN MAN. (E.) Saunders, D. R. (U. Washington Dept. Med., Seattle). *Gastroenterology* 59(6):848-852, 1971.

Studies were performed on a 20-yr-old woman and a 65-yr-old woman who had T-tubes inserted in the common bile duct. In an experiment designed to measure the excretion rate of biliary ^{14}C and ^{3}H, subjects received 0.854 moles of a lecithin, 1-9,10-^{3}H-palmitoyl-2-oleoyl-*sn*-glycero-3-phosphoryl choline, in 240 ml whole milk p.o., and the previously-clamped T-tube was opened intermittently to allow 1-hr collections over the next 4-5 days in conjunction with a daily diet of 80 g fat. In the young woman, none of the ^{14}C and only 2.3% of the ^{3}H was excreted in a pooled 3-day fecal collection; in the other woman, none of the ^{14}C and only 3.7% of the ^{3}H appeared in a 5-day stool collection. For both, the slope of the regression line for the rate of decay of radioactive label with respect to time in the bile was steeper for ^{3}H than for ^{14}C, indicating that the lecithin had been absorbed. At another time, when the 1st patient received ^{14}C-choline plus ^{3}H-palmitate in 240 ml of milk, similar amounts of label accumulated in the bile as when she received both isotopes within the same lecithin molecule.

1958 THE ASSAY OF ENDOGENOUS CHOLECYSTOKININ AND FACTORS INFLUENCING ITS RELEASE IN THE DOG AND CAT. (E.) Berry, H. (King's Coll. Hosp., London) and R. J. Flower. *Gastroenterology* 60(3):409-420, 1971.

In an assay of circulating cholecystokinin, superfused strips of rabbit gallbladder were sensitive to concentrations of cholecystokinin as low as 1-2 Ivy dog units. There was a linear relationship between the administered dose in dogs and cats in Ivy dog units and the tissue response up to a concentration of 15 milliunits/ml, the point of maximum response. This maximal response was reached after superfusion for 1 hr and was maintained for at least 12 hr. Vagal stimulation caused contraction of the gallbladder, but was not accompanied by a measurable release of cholecystokinin. Cholecystokinin activity was the same after i.v. or intraportal infusion. The circulatory half-life of cholecystokin was 10-15 min. A far greater release of cholecystokin was obtained when the lumen of the duodenum and proximal jejunum was fused with 0.025-0.1 N HCl than with emulsified fat, long or short chain fatty acids or 10% peptone. With the HCl, cholecystokinin was detected in portal venous blood within 1-3 min and maximal concentrations were reached in 5-10 min. This release was blocked by hexamethonium (2 mg/kg, i.v.), but not by atropine (200 μg/kg). Intraluminal administration of cevadine (20 μg/ml) potentiated the response to HCl. No effects were seen with up to 200 μg/ml of either histamine, 5-hydroxytryptamine, substance P (allopregnane-3β,17α, 21-triol-20-one), ATP, acetylcholine, or prostaglandin E_2. Cholecystokinin was also released when the bowel was perfused with nicotinic acid (200 μg/ml).

1959 THE EFFECT OF ATROPINE ON BILE SECRETION IN DOGS. (E.) Geist, R. E. and R. S. Jones (VA Hosp., San Francisco, Calif.). *Surgery* 69(4):563-568, 1971.

Mongrel dogs were prepared by cholecystectomy, ligation of the lesser pancreatic duct, insertion of a modified Thomas cannula into the duodenum opposite the opening of the common bile duct, and insertion of another Thomas cannula into the stomach. Experiments were begun no earlier than 3 weeks after surgery and were performed no more than 3 times weekly. After i.v. infusion with 0.9% NaCl for four 15-min periods, 0.5% sodium taurocholate was added, and test substances were later administered by i.v. injection or i.v. infusion. Administration of 1 unit/kg of regular insulin i.v. caused a 2.5-fold increase in bile flow compared with control values. When 0.08 mg/kg atropine was injected i.v. immediately prior to i.v. injection of 1 unit/kg regular insulin, there was no change in the bile volume compared to injection of insulin alone. Bile bicarbonate output, chloride concentration and chloride output were all significantly increased following insulin alone, but atropine had no significant effect on these values. Bile salt concentration was significantly depressed after insulin, but atropine did not alter this. Neither insulin alone nor insulin plus atropine had any effect on bile salt output. During the 3rd 15-min period after insulin injection, the peak acid output after insulin alone (6.3 mEq/15 min) was significantly greater than that after insulin plus atropine (0.9 mEq/15 min); there was no such difference in the 8th 15-min period after insulin injection. In the absence of exogenous insulin, when 0.08 mg/kg atropine was given i.v. during infusion of 0.9% NaCl plus 0.5% sodium taurocholate, there was no change in bile flow rate. When 0.08 mg/kg atropine was injected during infusion of 8 μg/kg/hr glucagon, there was no decrease in bile flow.

1960 THE CHOLERETIC EFFECTS OF GLUCAGON AND SECRETIN IN THE DOG. (E.) Jones, R. S. (VA Hosp., San Francisco, Calif.), R. E. Geist and A. D. Hall. *Gastroenterology* 60(1):64-68, 1971.

After cholecystectomy, ligation of the lesser pancreatic duct, and cannulation of the duodenum and stomach, 3 mongrel dogs were studied for the choleretic effects of the hormones glucagon and secretin. Both secretin and glucagon caused increased bile flow, chloride concentration, and decreased bile salt concentration. Although glucagon failed to cause significant increases in bile bicarbonate concentration, both hormones stimulated increased outputs of both bicarbonate and chloride ions. The lowest dose of glucagon used caused bile flows lower than control values, suggesting that glucagon inhibits, as well as stimulates, bile flow. There was a significant positive correlation between bile flow and chloride concentration for both glucagon and secretin. Secretin was 5.6 times more potent than glucagon on a weight basis and 5.0 times more potent on a molar basis. Perhaps such peptide choleretics as cholecystokinin, gastrin II, and cerulein also act on the bile ductules beyond the canaliculi.

1961 EFFECT OF GLUCAGON ON HEPATIC BILE SECRETION IN MAN. (E.) Dyck, W. P. (Scott and White Mem. Hosp., Temple, Tex.) and H. D. Janowitz. *Gastroenterology* 60(3):400-404, 1971.

Glucagon increased the rate of flow to peak levels within 10 min in all cholecystectomized subjects with T-tubes in their common bile ducts, and its effect lasted no longer than 30 min following injection. Although in 4 subjects there was a suggestive slight increase in bile bicarbonate concentration following glucagon, this alteration in electrolyte composition was insignificant. In general, the electrolyte composition of hepatic bile resembled normal plasma values and values previously reported for hepatic bile in man. A mechanism whereby glucagon might influence the flow of hepatic bile would be through its effect on the hepatic vascular response, since liver blood flow increases fairly rapidly following glucagon injection.

1962 BILE PIGMENT-PHOSPHOLIPID INTERACTIONS. (E.) Talafant, E. (J. E. Purkyne U. Dept. Med. Chem., Brno, Czechoslovakia). *Biochim. Biophys. Acta* 231(2):394-398, 1971.

Aggregate formation of bile pigments with various phospholipids under differing conditions was studied to better understand the binding of bile pigments to membrane lipids. The most active phospholipids in aggregate formation were the lecithins and unsaturated Kephalin, and to a lesser extent sphingomyelin and dipalmitoyl Kephalin. No significant transfer occurred with lysolecithin or cardiolipin. Compared with free bilirubin, conjugated bilirubin was preferentially transferred in the presence of albumin into an ether solution of phospholipid. In contrast, free bilirubin was transferred more effectively into chloroform than conjugated bilirubin. Albumin and, to a lesser extent, taurocholate decreased the transfer of conjugated bilirubin into the ether-lecithin phase due to binding of the conjugated bilirubin-lecithin aggregate in the aqueous phase. Gangliosides enhanced the aggregate formation in the ether phase. Increased temperature and decreased pH enhanced the bile pigment transfer into the ether lecithin phase. Triglycerides decreased the transfer, while cholesterol and its palmitate ester were without effect on unsaturated lecithin transfer, but decreased the transfer of dipalmitoyl lecithin.

1963 EFFECT OF 17α-ETHINYLESTRADIOL ON THE BILIARY METABOLITES OF 17β[6,7-$^3H_2$] ESTRADIOL IN THE RAT. (E.) Watanabe, H. (Dept. Natl. Health Welfare, Ottawa, Ontario, Canada). *Biochim. Biophys. Acta* 231(2):399-405, 1971.

The metabolic pattern of 17β-estradiol in bile was studied by gas-liquid chromatography and radioactive labeling to determine the effect of 17α-ethynylestradiol on female rats. Treatment with 17α-ethynylestradiol produced a marked reduction in the rate of bile flow. The quantitatively major metabolite in control samples had a mobility similar to that of 2-methoxyestrone, while lesser amounts of radioactivity travelled with 2-hydroxyestrone and estrone. These 3 metabolites constituted 75% of the biliary "glucuronide" conjugates. Treatment with 17α-ethynylestradiol produced marked alteration in the proportions of metabolites excreted. The levels of 2-methoxyestrone were reduced by more than 40%, while those of 2-hydroxyestrone were decreased more than 30%. There was a simultaneous 2-fold increase in the quantities of polar material. The levels of 17β-estradiol, 2-methoxyestradiol, and 2-hydroxyestradiol tended to be increased in treated animals.

1964 THE EFFECT OF BILE SALTS UPON LECITHIN SYNTHESIS. (E.) Balint, J. A. (Albany Med. Coll., N. Y.), D. A. Beeler, E. C. Kyriakides and D. H. Treble. *J. Lab. Clin. Med.* 77(1): 122-133, 1971.

Male rats with bile fistulas were infused intraduodenally with saline, rat bile, or solutions containing bile salt, and then injected with an isotopic mixture containing $^{32}PO_4$, ^{14}C-methylmethionine, and ^3H-methylcholine 43 to 45 hr after cannulation. Bile flow, biliary excretion of phospholipids and bile salts, and the specific activities of hepatic, biliary, and plasma lecithins were consistently higher in rats receiving fistula bile, especially the linoleoyl lecithins. Rats receiving the bile solution demonstrated higher specific activities of lecithin of liver, bile, and plasma than controls. The effect was greater for ^3H-choline and ^{32}P than for ^{14}C-methyl groups from methionine. Also, following the artificial bile solution, 2 precursors of lecithin, phosphorylcholine and cytidine diphosphate-choline, were unchanged. Perhaps there is one site within the liver for lecithin synthesis which provides this lecithin for bile, liver, and plasma.

1965 HEPATIC STORAGE AND EXCRETION OF BILIRUBIN IN THE DOG. (E.) Raymond, G. D. (Emory U. Sch. Med., Atlanta, Ga.) and J. T. Galambos. *Am. J. Gastroenterol.* 55(2): 119-134, 1971.

Mongrel dogs were prepared with catheters in the femoral and pulmonary arteries, inferior vena cava, hepatic and portal veins, and in the common bile duct and urinary bladder. When dogs were infused with freshly dissolved bilirubin, the hepatic vein had the smallest concentration of indirect bilirubin and the largest concentration of direct bilirubin. During rising serum concentrations of bilirubin, arterial levels of indirect bilirubin were higher than caval levels, while the opposite effect was obtained during decreasing serum levels. When bilirubin was infused, the serum concentration rose at a virtually constant rate before reaching a plateau, at which point there was an exponential relationship between the plasma concentration and infusion rate that approximated first-order kinetics. During constant infusion of bilirubin, the mean hepatic removal (66%) consisted of about 26% from the hepatic artery and about 39% from the portal vein; 11.7% was removed by extrahepatic tissues, and 22% remained in the plasma. There were no significant differences between bilirubin and BSP with respect to extrahepatic uptake, maximum biliary excretion, relative hepatic storage capacity, and biliary transfer maximum.

1966 HEPATIC STORAGE AND EXCRETION OF BILIRUBIN IN MAN. (E.) Raymond, G. D. (Emory U. Sch. Med., Atlanta, Ga.) and J. T. Galambos. *Am. J. Gastroenterol.* 55(2):135-144, 1971.

In a study of bilirubin excretion and storage, subjects consisted of 10 healthy volunteers, 5 patients with nonhemolytic indirect hyperbilirubinemia, and 1 patient with hemolytic anemia due to congenital spherocytosis. All had normal liver biopsies and normal liver function tests, except for evidence of indirect hyperbilirubinemia of less than 5 mg/100 ml in 6 patients; 15 of the 16 had normal fecal urobilinogen excretion, reticulocyte counts, and hematologic studies. In the controls, the relative hepatic storage capacity for bilirubin was similar to that for BSP. The biliary transfer maximum in controls was less than that for BSP when the molarity of plasma bilirubin was higher than that of BSP. These 2 parameters in the 1 patient with hemolytic jaundice were identical to those in controls. The estimated relative hepatic storage capacity in the 2 patients with posthepatitis hyperbilirubinemia was not significantly different from that of controls, while in the 3 patients with idiopathic hyperbilirubinemia (Gilbert's syndrome), the mean value was 5 times lower than the lowest value in controls and 4 times lower than the mean value in those with posthepatitis hyperbilirubinemia. The biliary transfer maximum in patients with posthepatitis hyperbilirubinemia was significantly less than that in all other groups.

1967 BILIRUBIN AS A CHOLESTATIC AGENT. PHYSIOLOGIC AND MORPHOLOGIC OBSERVATIONS. (E.) Witzleben, C. L. (St. Louis U. Dept. Pathol., Mo.). *Am. J. Pathol.* 62(2):181-194, 1971.

In a study of bilirubin cholestasis, Sprague-Dawley rats received a single i.v. injection of 0.053-0.06 ml/100 g of an aqueous solution of 10% manganese sulfate. At 4 and 24 hr after injection, the bile ducts were cannulated for bile collection, and unconjugated bilirubin was infused i.v. for 30 min at 0.33 ml/min, (200 mg% bilirubin in an aqueous solution of 0.52 g/100 ml sodium carbonate and 0.52 g/100 ml sodium chloride). There was a significant depression of bile flow rate in rats injected with manganese 4 hr before infusion of bilirubin. Shortly after removal from the rat, this bile became opaque and rather viscid. This effect was also seen in vitro when the manganese solution was added to bile obtained from bilirubin-infused rats that had not been pretreated with manganese. The bile flow rate after 24 hr was essentially the same in experimental and control rats. After 4 hr, liver from experimental and control rats showed scattered foci of hepatocellular necrosis; in addition, experimental rats also showed a yellow acellular material within the lumens of many of their bile ducts. After 24 hr, there were no light microscopic differences between the 2 groups. Ultrastructurally, the experimental rats showed membrane-bound vacuoles of varied size in the cytoplasm of many of the parenchymal cells. Experimental rats showed increased canalicular dilatation and loss of canalicular microvilli, as well as the presence of apparent massive swelling of the pericanalicular ectoplasm. Changes were similar in both groups after 24 hr.

1968 BILE ACID METABOLISM IN MAMMALS. ULTRASTRUCTURAL STUDIES ON THE INTRAHEPATIC CHOLESTASIS INDUCED BY LITHOCHOLIC AND CHENODEOXYCHOLIC ACIDS IN THE RAT. (E.) Miyai, K. (U. Toronto Banting Inst., Ontario, Canada), V. M. Price and M. M. Fisher. *Lab. Invest.* 24(4):292-302, 1971.

After 1 hr of lithocholic acid (0.3 μM/ml) administration, total cholestasis, with no significant secretion of bile, was noted. At 3 hr, the majority of the bile canaliculi were dilated with partial or total loss of microvilli, and diverticulation was often found. Bizarre changes in the canalicular membrane were noted frequently. The rough endoplasmic reticulum was only partially fragmented and mitochondriae were slightly enlarged with peripheral distribution of their cristae and wide variation in their share in some liver cells, particularly those in which the bile canalicular changes were prominent. Addition of chenodeoxycholic acid (0.3 μM/ml) at 2 hr also induced complete cholestasis. After 3 hr, light and dark hepatocytes were seen extensively. The nucleoli and chromatin were clumped and dense granular aggregates appeared within the nucleoli. The numerous indentations of the plasma membranes along the sinusoidal surface of the liver cell and the dose association of clear vacuoles in the cytoplasm suggest that at least some of the clear single membrane bound vacuoles are related to endocytotic (pinocytotic) processes. While lithocholic acid exerts its cholestatic effect by inducing changes in the bile canaliculi, chenodeoxycholic acid has some effect as a result of extensive alterations in the hepatocellular ultrastructure.

1969 MECHANISM OF CHOLESTASIS. III. INTERACTION OF SYNTHETIC DETERGENTS WITH THE MICROSOMAL CYTOCHROME P-450 DEPENDENT BIOTRANSFORMATION SYSTEM IN VITRO. A COMPARISON BETWEEN THE EFFECTS OF DETERGENTS, THE EFFECTS OF BILE ACIDS, AND THE FINDINGS IN BILE DUCT LIGATED RATS. (E.) Denk, H. (Mt. Sinai Sch. Med., New York, N. Y.), J. B. Schenkman, P. G. Bacchin, F. Hutterer, F. Schaffner and H. Popper. *Exp. Molec. Pathol.* 14(2):263-276, 1971.

The detergent action of bile acids on endoplasmic reticulum during cholestasis was studied in rat livers by comparing the effects of synthetic detergents on the P-450 dependent microsomal biotransformation system with those previously shown with bile acids. The interaction of synthetic anionic (sodium lauryl taurate) and nonionic (Triton and polysorbate 80) detergents with the cytochrome P-450 dependent microsomal biotransformation system occurred in 3 stages comparable to those produced by bile acids in vitro. The first stage of the interaction, after addition of detergents was indicated by a type I shift of the spectrum of P-450, which indicated a binding to the enzyme of substrates at a lipoprotein region of the P-450. The 2nd stage, resulting from longer exposure or higher concentrations of detergents, was characterized by a loss of the binding ability of the enzyme system for type I substrates and a subsequent mixed inhibition of the aminopyrine demethylation. In the 3rd stage, the electron transfer chain was interrupted because of the detachment of the P-450 reductase, and the P-450 was degraded to the inactive soluble form. The detergent effect of bile acids may account for the endoplasmic reticulum alterations observed during cholestasis.

1970 THE EFFECT OF COOLING ON LIVER FUNCTION IN CATS. (E.) Larsen, J. A. (U. Aarhus Inst. Physiol., Denmark). *Acta Physiol. Scand.* 81(2):197-207, 1971.

Effects of decreased temperature on liver function were studied in cats by measuring the elimination rate of glycerol and ethanol and the hepatic uptake of Indocyanine Green. After a temperature fall of 1-2C, there was a 40% reduction in the rate of glycerol and ethanol elimination, and in the hepatic uptake of Indocyanine Green. Results with cooling of the portal vein and reduction of body temperature were comparable. These effects of cooling seem to demonstrate a direct effect of temperature on the liver. The fall in body temperature was accompanied by a decrease in oxygen uptake of about 8%/degree. Estimated hepatic blood flow was unaffected by cooling. Restricted distribution of blood flow in the liver, and a corresponding reduction in the functional capacity, may explain the observed results.

1971 MICROSOMAL HYDROXYLASE INDUCTION IN LIVER CELL CULTURE BY PHENOBARBITAL, POLYCYCLIC HYDROCARBONS, AND P,P'-DDT. (E.) Gielen, J. E. (Natl. Inst. Child Health, Bethesda, Md.) and D. W. Nebert. *Science* 172(3979):167-169, 1971.

Liver cells were obtained from fetal rat liver tissue in culture for enzyme studies. Induction of aryl hydrocarbon hydroxylase synthesis was seen when the cell culture medium was augmented with phenobarbital (0.1-5.0 mM), or with dimethyl sulfoxide solutions of 1,2-benzanthracene (0.9-26 μM), 3-methylcholanthrene (0.3-2.7 μM), or the insecticide, DDT (1-200 μM). Levels of enzyme-specific activity were about the same with the 2 hydrocarbons and were about 50% of these levels with the other 2 compounds (which were relatively similar). An additive effect was seen when either of the polycarbons was added to the medium in the presence of one of the other 2 compounds. This phenomenon was not observed when the 2 polycarbons were added together, but without either of the other substances; also, when DDT and phenobarbital were added without either of the polycarbons, an additive effect was not seen.

1972 PEROXIDATIVE OXIDATION OF METHANOL IN HUMAN LIVER: THE ROLE OF HEPATIC MICROBODY AND SOLUBLE OXIDASES. (E.) Goodman, J. I. (U. Michigan Med. Sch., Ann Arbor) and T. R. Tephly. *Res. Comm. Chem. Pathol. Pharmacol.* 1(4):441-450, 1970.

Microbodies in rat, monkey, and human liver preparations were relatively free of mitochondria as determined by the presence of catalase and the relative absence of cytochrome oxidase activity. Glycolate oxidase activity in the human liver microbody was about the same as that observed for the monkey. Specific activity of glycolate oxidase in the soluble fraction of human liver cells was about the same as that observed for the microbody fraction. When crystalline beef liver catalase was added to human hepatic soluble fractions and microbody preparations following membrane lysis with triton X-100 (0.2%), and after addition of glycolic acid, no increase in methanol oxidation occurred above that seen with addition of glycolate alone. This indicates that in human liver, catalase does not regulate the peroxidation of methanol. When exogenous H_2O_2 generated from glucose and glucose oxidase was added to hepatic microbodies or soluble fractions, rates for methanol oxidation were far greater than those obtained when hydrogen peroxide was maximally generated from glycolate oxidase. Methanol oxidation in man does not proceed through a peroxidative pathway, but rather through an alcohol dehydrogenase system.

1973 TIME-COURSE OF LIVER RAT ACCUMULATION IN MAN AFTER A SINGLE LOAD OF ETHANOL. (E.) Wiebe, T. (U. Lund Chem. Ctr., Sweden), A. Lundquist and P. Belfrage. *Scand. J. Clin. Lab. Invest.* 27(1):33-36, 1971.

Increase of the molar ratio of triglycerides to phospholipids was used to express triglyceride accumulation in the livers of 3 healthy young men given a single load of ethanol (3 g/kg) over a 5-hr period. The maximal hepatic triglyceride accumulation occurred at 24 hr, with considerable individual variation (2.5-fold increase); values returned to normal at 48 hr. Maximal blood ethanol concentrations were obtained at 6 hr and had decreased to zero by 24 hr. A slight, but constant, rise of serum transaminase activity was seen in all individuals throughout the period; values at 48 hr were within normal limits. The study of the time course for hepatic lipid accumulation was possible by the use of a safe fine needle aspiration technique in combination with newly developed micromethods for lipid determinations in such biopsies.

1974 ETHANOL BINDING TO HEPATIC MICROSOMES - ITS INCREASE BY ETHANOL CONSUMPTION. (E.) Rubin, E. (Mt. Sinai Sch. Med., New York, N. Y.), C. S. Lieber, A. P. Alvares, W. Levin and R. Kuntzman. *Biochem. Pharmacol.* 20(1):229-231, 1971.

Control Sprague-Dawley female rats received a liquid diet for 24 days, while pair-fed experimental littermates received a similar diet in which ethanol was substituted isocalorically for carbohydrate, and which provided 36% of the calories. Blood ethanol levels during periods of random access to ethanol averaged 70 mg/100 ml and rarely exceeded 100 mg/100 ml. After this period, rats were decapitated and subcellular fractions of liver were analyzed. Chronic administration of ethanol caused a mean increase of 82% in the concentration of cytochrome P-450. There also were significant increases in the ethyl isocyanide difference spectra at 430 and 455 nanometers (.43-.455 μm) in experimental rats, although the ratio of the 455-manometer peak to the 430 peak remained the same for both groups. There were also significant increases in the CO difference spectra, and in the ethanol difference spectra.

1975 BILE SALT SYNTHESIS IN TRANSPLANTED HUMAN LIVER. (E.) Javitt, N. B. (Cornell Med. Ctr.-New York Hosp., N. Y.), M. H. Shiu and J. G. Fortner. *Gastroenterology* 60(3):405-408, 1971.

Bile excretion studies were performed in a liver transplant patient. The biliary bile salt concentration was 5.6 μmoles/ml during the 24-hr period immediately after total hepatectomy and orthotopic hepatic homotransplantation. At this time, cholate and chenodexoycholate were the major components. On the 2nd postoperative day, the total bile salt concentration increased to 11.9 μmoles/ml with a marked increase in the proportion of cholate. During the next 19 days, bile salt concentration ranged from 8.8-26.2 μmoles/ml, and as much as 1.72 mmoles of bile salt were collected during a 24-hr period. Cholate continued to constitute the major component. This was compatible with a synthesis rate twice that in an individual with intact enterohepatic circulation. On the 1st postoperative day, the direct and total bilirubin concentrations were 3.4 and 5.4 mg/100 ml, resp.; these rose to 13.9 and 18.4 mg/100 ml, resp., by the 13th day, and then dropped to 4.2 and 5.7 mg/100 ml, resp., on day 17. Bile volume on the first 2 postoperative days was 50-55 ml and rose erratically to 82-85 ml by days 20-21. The observed decrease in bilirubin to bile salt ratio during the recovery phase indicates some special interference in conjugated bilirubin transport following orthotopic transplantation.

1976 ALBUMIN LOSSES IN BILE AFTER PARTIAL HEPATECTOMY. (E.) Butterfield, P. T. (Ohio State U. Coll. Med., Columbus), G. M. Penn and N. R. Thomford. *Surgery* 68(4):651-655, 1970.

The effect of partial hepatectomy (median and left lateral lobes) on albumin losses in bile of Wistar rats was investigated by serum protein electrophoresis and immunodiffusion techniques. The mean serum albumin concentrations of animals tested 12 and 24 hr after partial hepatectomy were both significantly decreased. Partial hepatectomy resulted in a reduction in the bile volume and an increase in the concentration of albumin in the bile after 24 hr. Thus, it is unlikely that loss of albumin in bile is a significant factor in the hypoalbuminemia which follows partial hepatectomy.

1977 MITOTIC RATES OF REGENERATING LIVER PARENCHYMA AND DAB INDUCED PRIMARY HEPATOMA. (E.) Bertalanffy, F. D. (U. Manitoba Fac. Med., Winnipeg, Canada), J. C. W. Parrott and M. L. Ozohan. *Acta Anat.* 77(2):216-237, 1970.

Mitotic rates were determined in the liver parenchyma of adult Sprague-Dawley male rats by the colchicine method under the following controlled conditions: normal adult males; rats hepatectomized 18 hr to 8 days after liver excision; parabiotic twins after partial hepatectomy; and rats bearing transplantable BW 7756 and 3'-methyl-4-dimethylaminoazobenzene (DAB)-induced hepatomas. In the regenerating rat liver, the mitotic rate rose rapidly on the 2nd day after partial hepatectomy, remained high until 54 hr, and declined rapidly with complete regeneration by 8 days. In parabiotic rats, partial hepatectomy of 1 rat caused significant mitotic activity in the liver of the partner rat, suggesting a "hepatotropic principle." Induction of hepatomas by DAB yielded neoplasms proliferating at rapid rates; however, the mitotic activity of none of the malignancies approached that of the normal regenerating liver when maximally proliferating, signifying that even highly neoplastic hepatomas do not necessarily proliferate at peak capacity of the liver cell population.

1978 INTERACTION OF MIXED-FUNCTION OXIDASE WITH ITS SUBSTRATES AND ASSOCIATED REDOX TRANSITIONS OF CYTOCHROME P-450 AND PYRIDINE NUCLEOTIDES IN PERFUSED RAT LIVER. (E.) Sies, H. (Univ. Inst. Physiol. Chem., Munich, Germany) and B. Brauser. *Eur. J. Biochem.* 15(3):531-540, 1970.

1979 EFFECTS OF PYRIDINE STRUCTURES ON HEPATIC TRYPTOPHAN PYRROLASE. (It.) Chiancone, F. M. (Lepetit Co. Res. Clin., Milan, Italy), E. Ginoulhiac and L. Bonollo. *Acta Vitamin. Enzymol. (Milano)* 24(4-5):113-117, 1970.

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2028 MICROSCOPIC AND ENZYME HISTOCHEMICAL STUDIES ON THE LIVER AND KIDNEY OF RATS TREATED WITH FULVINE, THE TOXIC ALKALOIDAL CONSTITUENT OF Crotolaria fulva. (E.) Persaud, T. V. N. (U. West Indies Dept. Anat., Kingston, Jamaica), H. P. Putzke, D. Tessmann and A. Bienengraber. *Acta Histochem. (Jena)* 37(2): 369-378, 1970.

2029 STUDY ON THE MECHANISM OF ACTION OF CARBON TETRACHLORIDE ON THE SULFOBROMOPHTHALEIN-ELIMINATING POWER OF THE LIVER. (Fr.) Haller, P. H. (Sch. Med., Paris). *C. R. Acad. Sci.* [*D*] *(Paris)* 271(19):1686-1688, 1970.

2030 DEFECTIVE OXIDATIVE METABOLISM OF RAT LIVER MITOCHONDRIA IN HEMORRHAGIC AND ENDOTOXIN SHOCK. (E.) Mela, L. (U. Pennsylvania Hosp., Philadelphia, Pa.), L. V. Bacalzo, Jr., and L. D. Miller. *Am. J. Physiol.* 220(2):571-577, 1971.

2031 ALTERATIONS IN THE FUNCTIONAL CAPACITY OF MITOCHONDRIA IN HEMORRHAGIC SHOCK. (E.) Baue, A. E. (Washington U. Sch. Med., St. Louis, Mo.) and M. M. Sayeed. *Surgery* 68(1): 40-47, 1970.

2032 EFFECT OF CHLORPROMAZINE ON THE DISPOSITION AND EXCRETION OF AMPHETAMINE IN THE RAT. (E.) Borella, L. E. (Ayerst Res. Lab., Montreal, Canada), J. Pinski and F. Herr. *Res. Commun. Chem. Pathol. Pharmacol.* 1(5):667-676, 1970.

2033 EFFECT OF CURCUMIN ON SERUM AND LIVER CHOLESTEROL LEVELS IN THE RAT. (E.) Rao, D. S. (Cent. Food Technol. Res. Inst., Mysore, India), N. C. Sekhara, M. N. Satyanarayana and M. Srinivasan. *J. Nutr.* 100(11):1307-1316, 1970.

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2035 EFFECT OF PHLORETIN ON BILIARY FUNCTION (PERFUSED RAT LIVER). (Fr.) Vanlerenberghe, J. (Sch. Med., Lille, France), N. Trupin and C. Bel. *J. Physiol. (Paris)* 62(Suppl. 3):457, 1970.

2036 LIPID COMPOSITION OF RBC GHOSTS, LIVER MITOCHONDRIA AND MICROSOMES OF ETHANOL-FED RATS. (E.) French, S. W. (Harbor Gen. Hosp., Torrance, Calif.), T. J. Ihrig and R. J. Morin. *Q. Stud. Alcohol* 31(4):801-809, 1970.

2037 EFFECT OF LOW ALIPHATIC ALCOHOLS ON THE METABOLISM OF CHLORAL HYDRATE IN RAT LIVER. (Ger.) Ho, Y. H. (U. Hamburg Pharmacol. Inst., Germany), I. Schwarze and K. Soehring. *Arzneim. Forsch.* 20(10):1507-1509, 1970.

2038 BILE SECRETION OF IOGLYCAMIDE (BILIVISTAN) AFTER INTRAVENOUS ADMINISTRATION OF ETHANOL IN DOGS. (Ger.) Hoenig, V. (U. Bern Inst. Clin. Pharmacol., Switzerland) and R. Preisig. *Therapiewoche* 20(40):2396, 1970.

2039 LIVER ACTIVITY DURING CONSIDERABLE PHYSICAL EXERCISE AS MEASURED BY THE SULFOBROMOPHTHALEIN TEST (BSP). (Pol.) Fojt, E. (Med. Acad. 3rd Intern. Dis. Clin., Katowice, Poland) and F. Majzel. *Pol. Arch. Med. Wewn.* 45(6):755-761, 1970.

2040 METABOLIC CHANGES DURING 24 HOURS' FASTING IN HYPOPHYSECTOMIZED AND ADRENALECTOMIZED RATS. (E.) Turinsky, J. (Charles U. Sch. Med., Prague, Czechoslovakia), P. Illner and V. Kubik. *Physiol. Bohemoslov.* 19(1-2):153-161, 1970.

2041 HEPATIC SULFATION OF ESTROGEN METABOLITES. (E.) Brooks, S. C. (Michigan Cancer Found., Detroit) and L. Horn. *Biochim. Biophys. Acta* 231(1):233-241, 1971.

2042 INFLUENCE OF ALBUMIN ON TESTOSTERONE METABOLISM IN ISOLATED PERFUSED LIVERS OF GUINEA PIGS. (E.) Demisch, K. (U. Dusseldorf Inst. Physiol. Chem., Germany), P. Birkelbach and W. Staib. *Hoppe Seylers Z. Physiol. Chem.* 352(2):181-188, 1971.

2043 ACTION OF TESTOSTERONE ON NUCLEIC ACIDS OF RAT LIVER SUBCELLULAR FRACTIONS. (E.) Corti, A. (U. Bologna Inst. Biol. Chem., Italy), M. G. Monti and M. S. Moruzzi. *Ital. J. Biochem.* 19(4):277-283, 1970.

2044 STUDIES ON THE METABOLISM OF C_{19}-STEROIDS IN RAT LIVER BIOSYNTHESIS OF SATURATED 17-OXO-$C_{19}O_3$ STEROIDS IN RAT LIVER MICROSOMES. (E.) Gustafsson, J. A. (Karolinska Inst., Stockholm, Sweden) and B. P. Lisboa. *Eur. J. Biochem.* 16(3):475-480, 1970.

2045 STUDIES ON DEOXYTHYMIDINE KINASE OF REGENERATING RAT LIVER AND Escherichia coli. (E.) Bresnick, E. (Baylor Coll. Med., Houston, Tex.), K. D. Mainigi, R. Buccino and S. S. Burleson. *Cancer Res.* 30(10):2502-2506, 1970.

2046 EFFECT OF THE GASTRECTOMY ON EXPERIMENTAL LIVER REGENERATION IN AGED RATS. (It.) Pietranera, P. (U. Parma Inst. Semeiot. Med., Italy) and S. Ceccato. *G. Gerontol.* 18(2):71-75, 1970.

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2047 REGIONAL VARIATION IN THE AEROBIC METABOLISM OF INTESTINAL MUCOUS MEMBRANE. (E.) Bamford, D. R. (Queen's U. Dept. Zool., Belfast, Ireland) and J. E. Holmes. *Comp. Biochem. Physiol.* 38(3A):603-610, 1971.

The respiration rate of different regions of the small intestine of neonatal rats, examined using a direct manometric method, decreased with increasing distance from the proximal portion. Measurements of oxygen uptake of separated mucosal and muscle layers indicated that regional variation in oxygen uptake of whole intestinal wall is a function of the activity of the mucosal tissue of the different regions. Observations on mitochondrial structure conflicted with the evidence for a respiratory gradient from the jejunal to ileal portions of the intestine; however, there were more than twice as many mitochondria per jejunal cell profile than for ileal cells. The concentration of succinic dehydrogenase in the different regions of a single intestine decreased in all cases from the lower jejunum to the lower ileum. Individual mucosal cells apparently have different respiratory potentials dependent upon their position along the intestine; such a gradient possibly reflects the general capacity of the intestinal epithelium in different regions to either synthesize important compounds or actively absorb digested food from the lumen.

2048 EFFECTS OF PARENTERAL HYPERALIMENTATION ON UPPER GASTROINTESTINAL TRACT SECRETIONS. (E.) Hamilton, R. F., W. C. Davis (U. Nebraska Coll. Med., Omaha), D. V. Stephenson and D. F. Magee. *Arch. Surg.* 102(4):348-352, 1971.

Pancreozymin and/or secretin were administered to 5 dogs in a study of the effect of parenteral hyperalimentation on upper gastrointestinal tract secretion. Fasting blood glucose levels increased from an average of 86 ml/100 ml to an average of 720 mg/100 ml during this period. The mean 10-min volume of duodenal outflow decreased 50.5%, with the reduction always occurring within 20 min. Mean 10-min secretion of amylase decreased 70.8%, while the bicarbonate concentration in duodenal fluid increased 18.2%. Mean bilirubin excretion decreased 86.2%, and total protein content decreased 73.1%. Changes in the volume of gastric secretion and in the content of pepsin were neither consistent nor statistically significant. Parenteral hyperalimentation seems to produce a positive nitrogen balance, to limit the flow from, as well as alter, the content of fistulas which drain digestive juices, and therefore aids in improving survival rates.

2049 THE EFFECT OF DIET ON LACTASE ACTIVITY IN THE RAT. (E.) Bolin, T. D. (U. New South Wales Sch. Med., Sydney, Australia), A. McKern and A. E. Davis. *Gastroenterology* 60(3):432-437, 1971.

Wistar rats were fed a completely synthetic diet (30% protein, 50% carbohydrate, 9.6% fat plus vitamin, and mineral supplements), with or without the addition of 10% lactase. Both groups of rats grew at the same rates. Intestinal lactase (mainly the pH 5.8 fraction from the jejunum) activity in both groups continued to decline after weaning, and reached a minimum after 6 weeks. Thereafter, lactase levels remained constant in controls, but began to rise in experimental rats after 8 weeks and was maintained at significantly increased levels until 24 weeks. At this time, controls began to receive lactose and experimental rats were taken off lactose. After another 8 weeks, there was a decrease of lactase activity in the original experimental group, and an increase of lactase activity in the original control group. The diets were again reversed at 32 weeks of age. After an additional 8 weeks, lactase activity again declined in the original controls, and this decline was maintained at the end of 10 weeks when they were sacrificed. Although there was no increase in lactase activity in the original experimental rats 8 weeks after resumption of the lactose diet, lactase activity was significantly greater than in the controls at the end of 10 weeks. Changes in lactase were accompanied by changes in sucrase and maltase, but not of alkaline phosphatase. In 20-cm closed loops of intestine, experimental animals showed significantly greater hydrolysis of ^{14}C-1-lactose than controls. When 10% lactose was administered in the drinking water, experimental rats again showed elevated activity of jejunal and ileal lactase at 10 weeks of age, and this effect was maintained for 5 additional weeks until termination of the experiment.

2050 CHOLESTEROL SYNTHESIS IN THE INTESTINE OF MAN: REGIONAL DIFFERENCES AND CONTROL MECHANISMS. (E.) Dietschy, J. M. (U. Texas (Southwestern) Med. Sch., Dallas) and W. G. Gamel. *J. Clin. Invest.* 50(4):872-880, 1971.

Suction biopsies of the small intestine were performed in controls, patients undergoing biopsy to establish the diagnosis of idiopathic sprue, patients with obstructive biliary disease, and patients undergoing colectomy and ileostomy; human liver tissue was obtained from patients undergoing needle biopsy for diagnosis. During control periods, subjects ate a low cholesterol diet (93-280 mg/day) while during experimental periods they ate a high cholesterol diet (3,400 to 4,000 mg/day). In the 29 controls, the rate of cholesterol synthesis (as mμmoles/g/2 hr) for each region of the gastrointestinal tract was: stomach, 25; proximal duodenum, 90; distal duodenum, 80; distal jejunum, 35; distal ileum, 280; rectum 40. Compared with a control value of 80 mμmoles/g/2 hours in the distal duodenum, fasting for 48 hr decreased the rate by 50%, while cholesterol feeding for 7 days had essentially no effect; cholesterol feeding also had no effect on the rate of synthesis in the distal ileum. In the

4 patients with biliary obstruction and disruption of the intrahepatic circulation, the rate of synthesis was increased more than 4 times.

2051 STUDIES OF SMALL BOWEL ADAPTATION AFTER INTESTINAL RESECTION IN THE RAT. (E.) Weser, E. (U. Texas Med. Sch., San Antonio) and M. H. Hernandez. *Gastroenterology* 60(1):69-75, 1971.

Morphology, disaccharidase activity, and transport activity were studied in the small intestine of fasting male Sprague-Dawley rats sacrificed 5-6 weeks after a 50-cm resection of either proximal or distal small intestine or sham operation. Remaining intestinal segments had increased thickness and diameter. The mean villous height and the number of epithelial cells per μ of villous surface were greater in both proximal and distal intestine remnants than in comparable segments from the control group of rats. Lactase, sucrase, and maltase activities were significantly lower in homogenates of both whole mucosa and isolated villous epithelial cells from both proximal and (with the exception of sucrase) distal remnants. Studies with epithelial cells incubated with C^{14}-glucose and C^{14}-leucine indicated active transport similar to activity from cells from control segments; however, when determined as a function of the number of cells, the net transport of both substrates was reduced in the distal remnant. Glucose transport in everted sacs from proximal remnants was significantly less than from controls. The presumably less mature and smaller cells in the remaining hyperplastic segment after small intestine resection have diminished disaccharidase and transport activities.

2052 ALTERATION OF INTESTINAL MICROFLORA FOLLOWING PREOPERATIVE MECHANICAL PREPARATION OF THE COLON. (E.) Nichols, R. L. (Abraham Lincoln Sch. Med., Chicago, Ill.), S. L. Gorbach and R. E. Condon. *Dis. Colon Rectum* 14(2):123-127, 1971.

Mechanical bowel preparation (enemas, low residue diet, and cathartics) effectively emptied the colon of gross feces in all treated cholecystectomy patients but did not reduce the concentrations of most species of fecal microorganisms. Coliform bacteria were the only organisms significantly altered following mechanical cleaning, there being no differences in concentrations of anaerobic bacteria (bacteroides, bifidobacteria, streptococci, and clostridia) and most aerobic or microaerobic microorganisms. Although vigorous preoperative cleansing caused a marked reduction in the mass of fecal material in the large bowel, the residual material in the lumen of the bowel still contained fecal organisms in a concentration which represent a potential source of wound contamination.

2053 PROTEIN LOSS FROM THE NORMAL HUMAN SMALL INTESTINAL MUCOSA. (E.) Da Costa, L. R. (Hotel Dieu Hosp., Kingston, Ontario, Canada). *J. Nutr.* 101(4):431-435, 1971.

Protein loss from the small intestine was estimated in 12 Jamaican subjects without signs of malabsorption and with normal small intestinal mucosa by measuring the protein of intestinal washings. The mean protein loss rate from 5 cm of duodenal mucosa was 2.1 mg/min which, if extrapolated, is 30 g/24 hr. No major trauma occurred as a result of the washings as seen by normal gross and histologic appearance of the mucosa and lack of blood in the specimens. The debris in the washings consisted mainly of epithelial cells with less than 5% inflammatory cells. The recovery of known quantities of protein added to the distal specimens was 96.7%. Protein loss from the intestinal mucosa seems to be quite substantial.

2054 PROTEIN LOSS AND CELL LOSS FROM THE SMALL-INTESTINAL MUCOSA. (E.) Da Costa, L. R. (U. West Indies Dept. Med., Kingston, Jamaica), D. N. Croft and B. Creamer. *Gut* 12(3):179-183, 1971.

Male albino rats were prepared with polyvinylchloride cannulae in the jejunum at the duodenojejunael flexure and at the terminal ileum; normal saline was then infused proximally and collected distally. When the small intestine was perfused with saline, the DNA and protein content of the washings increased with an increased rate of washing; there was a highly significant relationship between the loss of these 2 substances. At a constant washing rate (250 ml/hr), there was significantly more DNA and protein in washings from rats infested with the nematode, Nippostrongylus brasiliensis, than in those obtained from normal intestinal mucosa. There was a highly significant relationship between the DNA and protein content of suspensions of isolated rat epithelial cells obtained by treatment of intestinal mucosa with pronase.

2055 *THE ABSORPTION OF GLYCINE AND GLYCINE OLIGOPEPTIDES BY THE RAT. (E.) Peters, T. J. (Rockefeller U. Dept. Biochem. Cytol., New York, N. Y.) and M. T. MacMahon. *Clin. Sci.* 39(6):811-821, 1970.

Glycine and glycine oligopeptide absorption was studied in rats by assaying samples of portal venous and femoral arterial plasma and mesenteric lymph before and during the intraduodenal infusion of high concentrations (100 mmoles/liter) of the compounds. During the infusion of the peptides all plasma samples exhibited a significant increase in the concentration of free glycine, and small amounts of what was identified as diglycine using thin-layer chromatography. This was the only glycine oligopeptide found. None of these changes occurred during the infusion of free glycine. Similar concentrations of glycine and diglycine were detected in mesenteric lymph samples. Mesenteric lymph may be a dialysate of portal plasma. Glycine oligopeptides seem to be hydrolyzed to diglycine and free glycine at the intestinal brush border, and the diglycine appears to be hydrolyzed within the enterocyte cytoplasm.

2056 CHARACTERISTICS OF THE AMINO ACID TRANSPORT SYSTEM IN THE MUCOSAL BORDER OF RABBIT ILEUM. (E.) Hajjar, J. J. (Yale U. Sch. Med., New Haven, Conn.) and P. F. Curran. *J. Gen. Physiol.* 56(6):673-691, 1970.

The effects of various amino acid analogues on phenylalanine influx across the brush border were examined in an effort to characterize the transport system of the rabbit ileum. Affinity for the amino acid site in the transport system varied directly with the number of carbon atoms in the side chain of the amino acids tested. There was a linear relation between affinity for the transport site and molecular weight for glycine, alanine, valine, leucine, phenylalanine, tryptophan, tyrosine, minosine, histidine, and methionine. The introduction of substituents with a polar character into the phenylalanine ring decreased affinity, while non-polar groups increased affinity. Removal of the carboxyl group from phenylalanine caused a 12-fold decrease in affinity, while removal of the γ-amino group caused a 50-fold decrease. Alteration of the carboxyl group showed that the methyl ester and the amide of phenylalanine were effective inhibitors of phenylalanine infux. Thus, an ionized carboxyl group may not be essential for interaction with the transport site.

2057 EFFECTS OF INHIBITORS OF PROTEIN SYNTHESIS ON STRUCTURE AND FUNCTION OF THE CRYPTS OF THE SMALL INTESTINE. (E.) Verbin, R. S. (U. Pittsburgh Sch. Med., Pa.) H. Liang, L. M. Saez, G. Diluiso, P. J. Goldblatt and E. Farber. *Exp. Cell. Res.* 65(1):81-93, 1971.

Male white Wistar rats were injected i.p. with a single dose of 1 mg/ml cycloheximide, while male Fisher rats were injected i.p. with a single dose of 10 mg/ml of tenuazonic acid. Synthesis of protein, DNA, and RNA by intestinal crypt cells was measured by uptake of ^{14}C-labeled leucine, thymidine, and uridine, which were injected i.p. 20 min. before decapitation of animals. Autoradiography was performed after i.p. injection of labeled thymidine. Complete suppression of mitotic activity was seen when there was at least an 80% decrease in protein synthesis. In autoradiographs, it was seen that synthesis phase cells can continue to develop into the postsynthetic phase of the cell cycle despite marked suppression of DNA synthesis. Under conditions of cycloheximide-induced depression of synthesis of DNA and protein, there was a marked increase of RNA synthesis. By electron microscopy, it was seen that cellular degeneration did not accompany the observed changes in metabolic and functional activities.

2058 NONIMMUNOGLOBULIN PRECIPITIN LINES BETWEEN INTESTINAL FLUIDS AND ANTISERA IN IMMUNODIFFUSION STUDIES: AN EXPLANATION FOR THEIR OCCURRENCE AND HOW THEY CAN BE AVOIDED. (E.) Brown, W. R. (VA Hosp., Denver Colo.). *J. Lab. Clin. Med.* 77(2):326-334, 1971.

Two kinds of nonspecific lines were formed in human duodenal fluids in gel double-diffusion studies with sera or antisera: a nonprotein line with human and several animal sera, and a line with sera from goats or sheep that stained positively for protein. Protein precipitin lines between goat serum and intestinal fluid can be explained by the formation of insoluble complexes between an α-globulin in the serum and pancreatic trypsin and chymotrypsin in the fluids. Intestinal fluids did not form nonspecific precipitin lines (either protein or nonprotein) with the immune globulin fractions of goat or rabbit antisera prepared by 33% saturation with ammonium sulfate. Apparently, only the immunoglobulin fractions of these antisera should be used in immunodiffusion studies of intestinal secretions in order that nonspecific precipitin lines may be avoided.

2059 STUDIES OF SMALL BOWEL ADAPTATION AFTER INTESTINAL RESECTION IN THE RAT. (E.) Weser, E. (U. Texas Med. Sch., San Antonio) and M. H. Hernandez. *Gastroenterology* 60(1):69-75, 1971.

2060 CONTINUATION OF BIOLOGICAL ACTIVITY IN EXCISED SMALL INTESTINE OF THE ADULT WHITE RAT. (E.) Mohiuddin, A. (U. Lagos Coll. Med., Nigeria) and G. O. Olubi. *Acta Anat. (Basel)* 75(1):79-91, 1970.

2061 INHIBITORY ACTION OF TETRACYCLINE ON ACTIVE ABSORPTION OF GLUCOSE FROM THE INTESTINE. (Hun.) Gyongyossi, G. (Med. U., Debrecen, Hungary), B. Kelentey, O. Veress and M. Petko. *Kiserl. Orvostud.* 23(1):62-68, 1971.

2062 EFFECTS OF PHLORIZIN ON GLUCOSE TRANSPORT INTO BLOOD AND LYMPH. (E.) Largis, E. E. (U. North Dakota Sch. Med., Grand Forks) and F. A. Jacobs. *Biochim. Biophys. Acta* 225(2):301-307, 1971.

2063 COMPARATIVE ASPECTS OF LIPID BIOSYNTHESIS DURING ABSORPTION IN RAT JEJUNUM AND ILEUM. (E.) Jersild, R. A., Jr. (Indiana U.

Med. Ctr., Indianapolis). *Biochim. Biophys. Acta* 218(1):170-172, 1970.

2064 ESTIMATION OF LIPID ABSORPTION. (Ger.) Muller, G. (Martin Luther U. 2nd Med. Clin., Halle/Wittenberg, Germany). *Dtsch. Gesundheitsw.* 25(43):2013-2016, 1970.

2065 INDUCTION OF INTESTINAL BRUSH BORDER ALKALINE PHOSPHATASE BY VITAMIN D AND IDENTITY WITH Ca-ATPase. (E.) Haussler, M. R. (U. Pennsylvania Dept. Biochem., Philadelphia), L. A. Nagode and H. Rasmussen. *Nature (Lond.)* 228(5277):1199-1201, 1970.

2066 THE INFLUENCE OF CITRATE ON THE ABSORPTION OF CALCIUM FROM THE INTESTINE OF RATS: EXPERIMENTS WITH ISOLATED LOOPS. (E.) Serafettin Zileli, M. (Hacettepe U. Dept. Int. Med., Ankara, Turkey), G. Urunay, G. Kanra and F. Telatar. *Hacettepe Bull. Med. Surg.* 3(1-2):1-7, 1970.

2067 AGE, ALGINATES, AND CALCIUM AND STRONTIUM METABOLISM. CALCIUM AND STRONTIUM METABOLISM AS RELATED TO AGE AND ALGINATES. (Ser.) Gruden, N. (Yugoslav Acad. Arts Sci. Inst. Med Res., Zagreb), K. Kostial and M. Buben. *Arh. Hig. Rada Toksikol.* 21(1):27-33, 1970.

2068 THE INDUCTION OF CALCIUM BINDING PROTEIN BIOSYNTHESIS IN INTESTINE BY VITAMIN D_3. (E.) MacGregor, R. R. (VA Hosp., Kansas City, Mo.), J. W. Hamilton and D. V. Cohn. *Biochim. Biophys. Acta* 222(2):482-490, 1970.

2069 EFFECT OF ACTINOMYCIN D ON INTESTINAL ABSORPTION OF CALCIUM INDUCED BY LACTOSE. (Fr.) Labat, M.-L. (Cent. Nucl. Stud., Fontenay-aux-Roses, France). *C. R. Acad. Sci. [D] (Paris)* 272(15):2005-2008, 1971.

2070 ON THE SUBCELLULAR LOCATION OF VITAMIN D METABOLITES IN INTESTINE. (E.) Chen, T. C. (U. Wisconsin Dept. Biochem., Madison), J. C. Weber and H. F. Deluca. *J. Biol. Chem.* 245(15):3776-3780, 1970.

2071 ACTINOMYCIN D INHIBITION OF INTESTINAL TRANSPORT OF L-HISTIDINE AND OF VITAMIN D ACTION. (E.) Sugai, M. (Hokkaido U. Sch. Med., Sapporo, Japan) and I. Matsuda. *Experientia* 27(1):25-26, 1971.

2072 THE SIGNIFICANCE OF THE INTESTINAL MICROFLORA. (E.) Finegold, S. M. (U. California Sch. Med., Los Angeles). *Delaware Med. J.* 42(11):341-345 & 350, 1970.

2073 EFFECT OF DIFFERENT CARBOHYDRATES ON THE INTESTINAL FLORA OF THE RAT. (Ger.) Schulze, J., W. Muller-Beuthow and F. K. Grutte. *Zentralbl. Bakteriol.* [*Orig.*] 215(1):77-83, 1970.

2074 ENZYME HISTOCHEMICAL ACTIVITY IN SMALL INTESTINE OF THE GERMFREE CAT. (E.) Fowler, E. H. (Ohio State U. Dept. Vet. Pathol., Columbus) and M. W. Rohovsky. *Am. J. Vet. Res.* 31(8):1423-1428, 1970.

2075 DETERMINATION OF TRYPSIN ACTIVITY IN HUMAN INTESTINAL CONTENTS BY HYDROLYSIS OF BENZOYL-DL-ARGININE p-NITROANILIDE. (E.) Shapira, E. (Hadassah U. Hosp., Jerusalem, Israel), Y. Ben Yoseph and A. Russell. *Isr. J. Med. Sci.* 6(5):670-672, 1970.

2076 THE UTILIZATION OF THE α-GLYCEROPHOSPHATE AND MONOGLYCERIDE PATHWAYS FOR PHOSPHATIDYL CHOLINE BIOSYNTHESIS IN THE INTESTINE. (E.) Johnston, J. M. (U. Texas, Med. Sch., Dallas), F. Paultauf, C. M. Schiller and L. D. Schultz. *Biochim. Biophys. Acta* 218(1):124-133, 1970.

2077 ACTIVITY RATIO BETWEEN INTESTINAL AND CARDIOVASCULAR ACTIONS OF CAERULEIN AND RELATED SUBSTANCES IN THE ANAESTHETIZED DOG. (E.) Bertaccini, G. (U. Parma Inst. Pharmacol., Italy), P. Mantovani and G. L. Piccinin. *Adv. Exp. Med. Biol.* 8:213-220, 1970.

2078 METABOLISM OF ^{14}C-OCTANOIC ACID IN HUMAN SUBJECTS. (E.) Uzawa, H. (Kyushu U. Sch. Med., Fukuoka City, Japan), G. D. Michaels, P. D. S. Wood and L. W. Kinsell. *Jap. J. Nucl. Med.* 7(2):118-123, 1970.

See also numbers: 1802, 1817, 1842, 1848, 1851, 2048

2079 ACTION OF ACTINOMYCIN D ON THE GI TRACT: IMPLICATIONS FOR ENZYME INDUCTION STUDIES. (E.) Yatvin, M. B. (U. Wisconsin Med. Sch., Madison). *Proc. Soc. Exp. Biol. Med.* 136(3):1010-1013, 1971.

In male albino Wistar rats, stomach emptying was significantly inhibited by injection of actinomycin D (100 µg/100 g, i.p.) after a 24-hr fast, to animals intubated orally with a ^{14}C-labeled casein hydrolysate. Four hr after intubation, 45% of the radioactivity remained in the stomachs of actinomycin D-treated rats; only 3% was present in those of saline-treated controls. The decreased rate of amino acid incorporation into liver and serum proteins reflected the blocked state of the stomachs of the actinomycin D-treated rats. There was also an actual increase in total stomach content of the animals receiving the drug. The drug stimulated a bizarre appetite; large amounts of wood shavings and neoprene were consumed, and a marked degree of coprophagy was noted. The reciprocal relationship between stomach and liver radioactivity levels suggests that failure to observe induction of hepatic enzymes by diet in studies using actinomycin D-treated rats could result from an insufficient availability of inducers, rather than the more commonly credited inhibition of RNA synthesis.

2080 THE DUMPING SYNDROME. EXPERIMENTAL STUDIES ON PATHOGENESIS. (E.) Yamagishi, M. (Yokohama U. Sch. Med., Japan), T. Shogimen and M. Ishii. *Arch. Surg.* 102(1):40-42, 1971.

Direct observation of capillary blood flow in the mesentery was performed in rats anesthetized with an i.m. injection of 5.0-7.5 mg thiopental sodium. Observations were made before and during injection of 2.0-2.5 ml of hyperosmolar glucose (50%) into the exteriorized ileum; controls received intraluminal injections of the same volume of 5% and 10% glucose, glucose in water, normal saline, air, and Ringer's lactate solution. Microcirculation was also observed after i.m. injection of 10-15 mg heparin sodium after intraluminal injection of hypertonic glucose. Immediately after instillation of glucose into the intestine, many of the mesenteric venules showed decreased flow, stagnation, and finally agglutination of blood cells. After several min, sludging also started. These venular phenomena caused blood of the mesenteric microarteries (precapillaries, metarterioles, and arterioles) to flow in the opposite direction, some of which communicated directly with uninjured bigger venules through arteriovenous shunts. In controls, only occasional venular slowing was seen. In the heparinized experimental rats, the capillary circulation was sustained much better than in nonheparinized rats, without arrest of venular circulation and microarterial block. In another experiment with 7 dogs administered pentobarbital sodium (25 mg/kg i.v.), portal venous blood pH and O_2 pressure were increased after instillation of 100 ml of 50% glucose into the duodenum. The coefficient of oxygen consumption in the portal area (mainly the intestine) was lower after intraluminal hypertonic glucose; the results were just the opposite in dogs treated with an i.v. injection of 12.5 mg/kg heparin sodium. These observations can be applied to an hypothesis of the mechanism of the dumping syndrome by the fact that tissue hypoxia in the intestine, induced by fluid shift and rapid hemodynamic changes in the capillary bed, initiates the reflex activity of the autonomic nervous system.

2081 XYLOSE TEST: EFFECT OF ASPIRIN AND INDOMETHACIN. (E.) Kendall, M. J. (Queen Elizabeth Hosp., Birmingham, England), S. Nutter and C. F. Hawkins. *Br. Med. J.* 1(5748): 533-536, 1971.

Clinical studies were performed using the xylose test to determine intestinal drug absorption. Aspirin produced a considerable reduction in xylose output by a parenteral effect, probably by impairing renal function. Indomethacin had no significant influence on the excretion of xylose (5 g) administered i.v. However, indomethacin did reduce the excretion of orally administered xylose, indicating that its effect is probably an intestinal one. An increase in the amount of xylose leaving the stomach after 20 min was observed following indomethacin administration. Since indomethacin reduced xylose absorption and the reduction was not due to a delay in gastric emptying, malabsorption may be due to increased intestinal motility. Indomethacin could influence mucosal enzyme systems as it is an uncoupler of oxidative phosphorylation; this may explain the inhibition of amino acid transport in the rat intestine.

2082 ECK FISTULA ENCEPHALOPATHY: LONG-TERM STUDIES IN PRIMATES. (E.) Kline, D. G. (Louisiana State U. Sch. Med., New Orleans), J. N. Crook and F. C. Nance. *Ann. Surg.* 173(1): 97-103, 1971.

Five of 10 primates surviving portacaval shunts were given normal protein diets, while 5 were given high protein diets. All shunted animals lost weight, but only one had neurologic findings. Shunted animals (with one exception) survived until sacrificed from 332-435 days following surgery. All monkeys in which shunts remained open had elevated serum ammonia values throughout their courses. Despite hyperammonemia, primates had no neurologic changes and only suffered weight loss. Altzheimer cells (abnormal astrocytes) were present in the brains of monkeys on normal protein diets as well as on high protein diets, but average sstrocyte counts were relatively low in monkeys fed normal protein diets. Only when shunted monkeys were fed high protein diets did astrocyte counts approach those reported in dogs with Eck fistulas. These studies suggest that hyperammonemia may not be the only biochemical abnormality responsible for encephalopathy. The value of using monkeys in experimental studies of portal circulation, portacaval shunting, and its application to surgery in cirrhosis and esophageal varices is stressed.

2083 METABOLIC CONSEQUENCES OF PORTACAVAL SHUNTING IN THE RAT. EFFECTS OF WEIGHT, FOOD INTAKE, INTESTINAL ABSORPTION AND HEPATIC MORPHOLOGY. (E.) Assal, J.-P., R. Levrat, T. Cahn and A. E. Renold (U. Geneva Inst. Clin. Biochem., Switzerland). *Z. Gesamte Exp. Med.* 154(2):87-100, 1971.

In no instance out of 140 end-to-side portacaval shunt operations in rats was there any evidence for the development of a collateral circulation. During the first 2 weeks following shunts, there was a 5-10% loss of weight followed by a return to preoperative weight at 4-5 weeks. The relative weight of the liver decreased 22% within 5 days postoperatively, and reached 31% by 11 days. However, besides these atrophic changes, there was no significant histological determinable pathology. There were no nuclear alterations, no abnormal cytoplasmic appearance, no proliferation of connective tissue nor increased deposition of collagen. Both the amount of food ingested and the amount of food absorbed was significantly decreased 15 days after portacaval shunting when compared with sham-operated animals. Food intake returned to normal and food absorption was slightly increased at 3 months. The present study provides the basis for subsequent endocrine and metabolic comparisons between portacaval shunted animals and suitable controls because the procedure did not result in portal hypertension; the development of collateral alterations, which are known to be associated with disturbed intestinal absorption and abnormalities in the circulating level of some nutritional or hormonal components such as epinephrine and noreponephrine, was also not seen.

2084 ACUTE OCCLUSION OF THE PORTAL VEIN IN THE CALF. (E.) Battersby, C. (U. Queensland Dept. Surg., Australia), G. Balderson, J. Winch and W. Burnett. *J. Surg. Res.* 11(2): 95-100, 1970.

Hemodynamic and biochemical events following complete occlusion of the portal vein for 2 hr in calves were studied in an attempt to produce survival with approproate resuscitation. Systemic blood pressure fell immediately upon occlusion, and the portal blood became markedly acidotic with a rise in hematocrit and plasma potassium; this necessitated the rapid infusion of 3-4 liters of Hartmann's solution and 30-70 mEq sodium bicarbonate i.v. Circulating blood volume fell by 50% despite transfusion. With release of the occlusion, blood pressure returned to normal for several hr. A hemorrhagic enteropathy soon developed in the small intestine, and large quantities of serosanguineous fluid collected in the intestinal wall and lumen and in the peritoneal cavity. Marked hemoconcentration developed and resuscitation became unsuccessful. Portal blood cultures which were sterile prior to occlusion, grew *Escherichia coli* after occlusion. Sequestration of fluid on the portal circulation was the main cause of death following portal occlusion, but a rise in plasma potassium, coliform bacteremia, and progressive acid-base disturbances may be contributory factors.

2085 DEMONSTRATION OF A LETHAL ENDOTOXEMIA OF INTESTINAL ORIGIN IN REFRACTORY NON-SEPTIC SHOCK. (E.) Tamakuma, S. (Boston City Hosp., Mass.), R. Rojas-Corona, P. Cuevas and J. Fine. *Ann. Surg.* 173(2):219-224, 1971.

Refractory shock was produced in rabbits by temporary occlusion of the superior mesenteric artery or by i.v. norepinephrine infusion, and their blood was assayed for endotoxemia by the *Limulus* lysate technique. Endotoxemia was demonstrated in both types of shock, and in both cases the circulating endotoxin was responsible for the refractory state and subsequent death. This was indicated by a reduced frequency of endotoxemia, a milder hemodynamic disorder, and a high survival rate as a result of the prior placement of a large dose of nonabsorbable antibiotic into the small and large intestine. The integrity of the peripheral circulation is seemingly dependent upon the integrity of the reticuloendothelial system; ischemic injury to this system seems to allow endotoxon absorption from the gastrointestinal tract to produce peripheral vascular collapse.

2086 VOLUME, COMPOSITION, AND SOURCE OF INTESTINAL GAS. (E.) Levitt, M. D. (U. Minnesota Hosps., Minneapolis) and J. H. Bond, Jr. *Gastroenterology* 59(6):921-929, 1971.

Recent information concerning the volume, composition and source of intestinal gas in man was analyzed. The volume of flatus passed by way of a rectal tube ranged from 400 to 1200 ml/day. The composition of this gas depended on the site in the gastrointestinal tract from which it was obtained. Stomach gas usually had a composition relatively similar to that of atmospheric air. In general, flatus contained less than 2% O_2, with the remainder consisting of varying proportions of N_2, CO_2, H_2, and CH_4 (methane). The observed variability in flatus composition results from varying proportions of swallowed air and microbial gas production. The production of the various gases in the intestine was also considered. The major source of intestinal gas is commonly assumed to be swallowed air; however, in many instances, this accounts for only a small percentage of the gas present in the intestinal tract.

2087 THE INTESTINE AS A SOURCE OF PLASMINOGEN ACTIVATOR ACTIVITY. (E.) Gans, H. (New York Hosp.-Cornell Med. Ctr., N. Y.), K. Mori, R. Quinlan, D. Richter and B. H. Tan. *Proc. Soc. Exp. Biol. Med.* 136(2):627-629, 1971.

Mongrel dogs were subjected to complete, 1-stage hepatectomy; groups were also subjected to enterectomy with block resection of the rectum, colon, and small intestine up to, but not including, the duodenum and pancreas. All enterectomized/hepatectomized and some of the hepatectomized dogs were pretreated on the day before surgery with 3 oral doses of 500 mg neomycin. Euglobulin clot lysis time determinations were performed on samples of femoral arterial blood obtained by indwelling catheter just before and 3 hr after hepatectomy. After induction of pentobarbital sodium anesthesia, dogs not pretreated with neomycin showed low euglobulin clot lysis times, suggesting marked plasminogen activator activity, while these times were long in neomycin pretreated dogs. The difference in times between pretreated and nonpretreated dogs was highly significant; the difference between the pretreated hepatectomized and pretreated enterectomized/hepatectomized dogs was not significant. In nonpretreated and pretreated hepatectomized dogs, there was a significant shortening of the lysis time after surgery; in pretreated enterectomized/hepatectomized dogs, there was no significant lengthening of lysis time.

2088 ARTERIOGRAPHIC STUDY OF THE GASTRIC CIRCULATION. ITS IMPORTANCE FOR THE USE OF THE STOMACH AS A SUBSTITUTE FOR THE ESOPHAGUS. (Sp.) Olaciregui, C. J., R. Rostagno, E. Eyheremendy and J. E. Alberti. *Sem. Med. (B. Aires)* 137(14):469-471, 1970.

2089 ON THE CROSS REACTIVITY BETWEEN ANTIGENS OF Escherichia coli AND OF GASTRIC PARIETAL CELLS IN MAN. (E.) Fixa, B. (Charles U. Sch. Med., Hradec Kralove, Czechoslovakia), O. Komarkova, J. Prixova and Z. Nozicka. *Folia Microbiol. (Praha)* 15(6):503-504, 1970.

2090 EXPERIMENTAL STUDY OF HEPATIC BLOOD PERFUSION WITH ^{133}Xe. (Ger.) Blumel, G. (Univ. 1st Surg. Clin., Vienna, Austria), W. Massion, A. Mostbeck and L. Peschl. *Z. Gastroenterol.* 8(7):431-437, 1970.

2091 RELATIONSHIP BETWEEN THE INTRAHEPATIC ARCHITECTONICS OF THE HEPATIC VEINS AND THE CONTOUR OF THE LIVER. (Rus.) Smirnova, N. S. (Reg. Clin. Hosp., Vladivostok, USSR). *Arkh. Anat. Gistol. Embriol.* 59(9):89-95, 1970.

2092 EFFECT OF DIVIDED CALCIUM INTAKE ON CALCIUM METABOLISM. (E.) Kales, A. N. (U. Chicago Med. Sch., Ill.) and J. M. Phang. *J. Clin. Endocr.* 32(1):83-87, 1971.

2093 CHARACTERISTICS OF BLOOD VESSELS IN ARTIFICIAL ADHESIONS AS RELATED TO INTACT OR IMPAIRED BLOOD SUPPLY OF THE SUTURED ORGANS. (Rus.) Leites, A. L. (Khrghiz Med. Inst., Frunze, USSR) and E. S. Zobnev. *Arkh. Anat. Gistol. Embriol.* 59(9):3-9, 1970.

See also numbers: 1819, 1831, 1853, 1918, 1923, 1961, 2031

094 EFFECT OF ANTACIDS ON THE BERNSTEIN TEST IN ESOPHAGITIS. (E.) Boyle, J. D. 9808 Venice Blvd., Culver City, Calif.) and I. lasky. *Curr. Ther. Res.* 13(3):217-220, 1971.

rophylactic capabilities of 2 antacid formulations nd a liquid placebo were determined by the ernstein test in a randomized, double-blind rossover study of 30 patients with peptic sophagitis. Both preparations (10 ml each) howed significant prophylactic superiority to he liquid placebo. The antacids were not, owever, significantly different from each other. lthough first developed as an objective method or diagnosing the symptoms of esophagitis, the ernstein test should also be considered as a est for topically active drugs such as antacids.

095 AUTOANTIBODIES TO INTRINSIC FACTOR: THEIR DETERMINATION AND CLINICAL SEFULNESS. (E.) Rothenberg, S. P. (New York ed. Coll., N. Y.), K. R. K. Kantha and A. Ficarra. *Lab. Clin. Med.* 77(3):476-484, 1971.

sensitive new radioimmunoassay procedure has een developed for simultaneous detection of locking and binding autoantibodies to intrinsic factor in human sera and gastric juice. With this method, blocking antibody was found in 17 of 23 patients with pernicious anemia and binding antibody was present in 11. All sera positive for binding antibody also contained blocking antibody. No evidence of these antibodies was found in any of 14 sera samples from patients with folate-deficient megaloblastic anemia. Gastric juice from 4 of 7 patients with pernicious anemia contained blocking antibody, but no binding antibody was detected. The procedure for detecting anti-intrinsic factor antibodies uses much lower concentrations of vitamin B_{12} tracer than previously described methods, and can be adapted for routine use in diagnosing pernicious anemia and in screening for latent pernicious anemia in patients with associated diseases.

2096 GASTRIC VOLUMES ASPIRATED FROM ANTRUM AND FUNDUS IN MAN. (E.) Ivey, K. J. and L. DenBesten (Univ. Hosps., Iowa City, Iowa). *Am. J. Dig. Dis.* 16(2):123-126, 1971.

After a 12-hr fast, 8 healthy subjects were intubated with a Wangensteen duodenal tube, with the tip being placed in the antrum or fundus of the stomach. Gastric contents were aspirated and the stomach washed 4 times with 50-ml volumes of wash solution. A test solution (200 ml of HCl, 160 mEq/liter containing 25 μC/liter of ^{51}Cr) was instilled and mixed in vivo; a 30-ml aliquot was removed immediately after mixing, the rest being left in situ for 15 min. The stomach was then emptied, and washed with four 50-ml aliquots of wash solution (160 mEq/liter HCl) were saved for analysis. The subject remained in the left lateral decubitus position during the entire procedure, which was repeated up to 4 times. The mean residual volume and mean initial volume of 25 nasofundal and 25 nasoantral aspirations were nearly identical. The mean volume of the 15-min aspirate and the final residual volume from the fundus were slightly greater than those from the antrum, but neither difference was significant. The total volume emptied during the antral studies was not significantly greater than that on the fundal studies. In all 8 subjects, the fundal tube remained in place throughout the procedure, and there was no reflux of bile; in the antral site, bile aspiration occurred in 2 of the 8 subjects and the tube tip moved through the pylorus in both.

2097 THE VALUE OF A COMBINED PENTAGASTRIN/INSULIN TEST IN STUDIES OF STOMAL ULCERATION. (E.) Venables, C. W. (Roy. Victoria Infirm., Newcastle upon Tyne, England). *Br. J. Surg.* 57(10):757-761, 1970.

A combined pentagastrin/insulin test was performed on 220 patients before surgery, 100 patients 6 or more weeks after truncal vagotomy, and 44 patients suspected of having stomal ulceration after vagotomy. Secretion was collected by a "wash-out" technique before, during, and after the administration of 6.0 μg/kg pentagastrin (i.m.) and 0.2 units/kg insulin (i.v.). Vagotomy was effectively complete when the acid response to insulin was less than 45%, and the pepsin response was less than 70% of that to pentagastrin. Following vagotomy, the acid response to pentagastrin was reduced although its character was unchanged; after insulin, acid output continued to fall until the end of the test. After vagotomy, pentagastrin was a more effective stimulant of pepsin secretion and the effects of insulin were abolished. The use of this test as a diagnostic tool seems to have much value when assessing patients with suspected stomal ulceration, and for deciding on the type of surgery necessary in an individual.

2098 SIMPLE METHOD FOR REMOVAL OF INTESTINAL TUBING FROM THE STOMACH. (E.) Dupont, H. L. (U. Maryland Sch. Med., Baltimore), S. E. Greisman, R. B. Hornick, D. K. Wentz and A. R. Schwartz. *Ann. Intern. Med.* 74(4):584-586, 1971.

During studies of the small intestine, when intestinal tubing cannot be removed by firm traction on the proximal end, spontaneous passage through the intestinal tract usually occurs, provided the tube is beyond the stomach. A double-lumened vinyl tube used to study the bacterial content of the small bowel was sectioned after unsuccessful attempts to remove it with traction, without position verification by X-ray. The tube remained confined to the stomach for 29 days. Removal was accomplished by firm, slow removal with a nylon fishing line 24 hr after peroral insertion. The line was entangled with the rigid plastic tube. This approach is an alternative to esophagoscopy or gastrotomy for removing intestinal tubing from the stomach.

2099 RECOGNITION OF REGIONAL ILEITIS IN THE OPERATING ROOM. (E.) Weakley, F. L. (Cleveland Clin., Ohio) and R. B. Turnbull. *Dis. Colon Rectum* 14(1):17-23, 1971.

Reliable visible signs of regional ileitis (Crohn's disease) which can be found by examination of the patient in the operating room were studied. Perineal fistulas were present in 20% of 151 colectemy cases, and of these, 80% were cases of regional ileitis. Obvious chronic changes in these cases included tags, bridges, wetness and red coloration, pus and pigment changes, and the wound was indolent and did not heal postoperatively. These cases of regional ileitis were characterized by thickness of the integument of the anal canal. When there was primary ulcerative disease of the colon, regional ileitis was always characterized by serositis and enlarged mesenteric lymph nodes, and frequently by fat wrapping, inflammatory masses, strictures, fistulas, segmental distribution of disease, and cobblestoning. Normal mucosa was found between ulcers, and shortening of the colon and pseudopolyps were rare.

2100 ASSESSMENT OF A RADIOGRAPHIC METHOD FOR DIAGNOSIS OF INTESTINAL LACTASE DEFICIENCY: A PROSPECTIVE STUDY. (E.) Rosenquist, C. J. (Stanford U. Sch. Med., Calif.), J. W. Heaton, Jr., G. W. Friedland, G. M. Gray and F. F. Zboralske. *Invest. Radiol.* 6(1):40-43, 1971.

Two small bowel series were performed, 1 with sucrose added to the colloidal barium suspension and 1 with lactose added. The radiological method used detected all patients who had intestinal lactase deficiency; however, it also led to 2 false-positive interpretations. The 4 patients with proven intestinal lactase deficiency had positive studies as evaluated by 3 radiologists. These 4 cases had all 3 radiological features: small bowel dilation, appearance of diluted contrast material in the bowel, and decreased barium transit time to the cecum (less than 1 hr); the former 2 phenomena were more reliable. Neither of the 2 false-positive examinations showed all the radiological features of lactase deficiency, nor was agreement unanimous that the cases were positive. The stool lactose determination was less accurate than the radiological method for diagnosing lactase deficiency. By using a barium-lactose mixture routinely for small bowel radiological studies, it may be possible to detect previously unrecognized intestinal lactose deficiency in some patients whose symptoms are secondary to this condition.

2101 THE INFLUENCE OF SEX, BODY WEIGHT, AND RENAL FUNCTION OF THE XYLOSE TEST. (E.) Kendall, M. J. (Queen Elizabeth Hosp., Birmingham, England) and S. Nutter. *Gut* 11(12):1020-1023, 1970.

Sex differences, body weight, and renal function and their effects on interpretation of the xylose absorption test were studied. Consistently higher excretion values were observed for females following an i.v. dose of d-xylose, indicating superior renal function. Oral results were not consistent. No direct correlation between xylose excretion and body weight could be shown after p.o. or i.v. administration. Old age, renal impairment, and malabsorption may all account for low xylose excretion values. The use of a 2-hr oral/intravenous fraction makes the xylose test a useful diagnostic tool that is unaffected by age and renal function. The oral/intravenous fraction, independent of renal function, clearly distinguishes malabsorption from other causes of low values. Neither the sex nor the weight of the patient need be considered when interpreting the xylose test.

2102 THE COMBINED XYLOSE-DISACCHARIDE TOLERANCE TEST: ITS APPLICATION FOR DIAGNOSING DISACCHARIDASE DEFICIENCY. (E.) Fernandes, J. (Sophia Child. Hosp., Rotterdam, Netherlands) and J. H. van de Kamer. *Acta Paediatr. Scand.* 60(2):187-191, 1971.

The results of combined xylose-disaccharide tolerance tests in 6 children with sucrase-isomaltase deficiency and 61 normal individuals are described. The simultaneous determination of a xylose curve allowed a more certain interpretation of the blood glucose curve. A flat glucose curve combined with a normal xylose rise indicated an impaired enzyme hydrolysis, rather than a defective absorption of its component monosaccharides. Compared with the normal range (standard deviation ± 2) derived from 90 xylose curves of the 61 normal children, the sucrase-isomaltase deficiency children showed normal xylose curves.

2103 TEST-MEAL IN THE DIAGNOSIS OF MALABSORPTION IN INFANCY. TOLERANCE TESTS USING SIMULTANEOUS ORAL ADMINISTRATION OF GLUCOSE, D-XYLOSE, CREAM AND VITAMIN A. (E.) Norman, A., B. Strandvik (St. Goran's Hosp., Stockholm, Sweden) and R. Zetterström. *Acta Paediatr. Scand.* 60(2):165-172, 1971.

A test-meal consisting of 2 g of glucose/kg body weight, 0.5 g of D-xylose/kg, 8 ml standardized cream/kg, and 7500 IU vitamin A palminate was administered through a nasogastric tube to 16 normal infants (1-20 months old), 3 infants with cystic fibrosis, 3 with extrahepatic biliary atresia, and 4 with intrahepatic cholestasis. During the next 10-hr period, blood samples were analyzed for glucose, D-xylose, triglycerides,

d vitamin A. The results in both the normal
fants and those with malabsorption were com-
rable with those earlier observed using single
lerance tests (except for D-xylose). The
mbined test-meal has certain advantages over
e examinations currently being used in infants
th malabsorption because a series of tests is
oided, and it becomes easier to follow the
sorption of fats and carbohydrates during the
urse of disease and during treatment of the
fants.

04 VALUE OF LEUKOCYTE COUNTS IN THE RECOGNITION OF MESENTERIC INFARCTION
D STRANGULATION OF SHORTER INTESTINAL LENGTHS:
EXPERIMENTAL STUDY. (E.) Ghanem, M. (U.
nnesota Sch. Med., Minneapolis), R. L. Goodale,
Spanos, M. S. Tsung and O. H. Wangensteen.
rgery 68(4):635-645, 1970.

periments on dogs, rats, and mice indicated
at the peritoneal WBC is a reliable method for
agnosing mesenteric infarction and strangulation
shorter intestinal lengths. A progressive
crease in the peritoneal WBC attended superior
senteric artery occlusion, beginning at 6 hr
d becoming striking after 8 hr; the time of
set was the same in dogs, rats, and mice. The
lative magnitude of the peritoneal WBC was
markable similar in dogs and rats. After a
ort segment of the ileum was devascularized in
e rat, the peritoneal WBC was the same as after
perior mesenteric artery occlusion. Administra-
ion of cortisone (150 mg/kg/day s.c.) for 4 days
efore arterial ligation depressed, but did not
bolish, the intense leukocytosis. The peritoneal
BC at 6 hr after superior mesenteric vein ligation
as 50% lower than that occurring after arterial
igation, apparently due to copious peritoneal
ransudate which diluted the WBC. Increases in
he peritoneal WBC occurred early enough to be a
eliable indicator of intestinal devascularization.
eneral and consistent clinical application of
eritoneal tap in patients suspected of having
trangulating obstruction may reduce the high
ortality by making early diagnosis possible.

105 HEPATIC VENOUS ANGIOGRAPHY IN THE EVALUATION OF CIRRHOSIS OF THE LIVER.
E.) Smith, G. W. (Baltimore City Hosps., Md.),
. Westgaard and R. Björn-Hansen. *Ann. Surg.*
73(4):469-480, 1971.

ortal vein filling was demonstrated in 25% of 84
ases studied by wedged hepatic venous angiog-
raphy, however, no correlation could be made
etween the extent of portal vein filling and the
severity of the cirrhotic process. Reversal of
flow in the portal vein was rarely observed in
the entire group. With the free angiograms, on
the basis of increasing evidence of scarring and
decreasing evidence of regeneration, it was
possible to distinguish 4 progressive stages of
hepatic venous pathologic changes in cirrhosis.
Large, coarse indentations of the major venous trunks were occasionally observed and, when present, were associated with postnecrotic cirrhosis. These changes showed a positive correlation with progressive cirrhosis as assessed by the incidence of encephalopathy, decreased liver size, elevated prothrombin time, diminished maximum perfusion pressure, decreased estimated total hepatic blood flow, hypoalbuminemia, and both surgical and medical prognosis. Ascites was present and more severe in early cirrhosis. The stage of the cirrhotic process can apparently be adequately assessed with the use of the hepatic venous angiogram, which is of value in predicting both surgical risk and long term prognosis.

2106 INTRAVENOUS CHOLECYSTOGRAPHY AND METABOLISM OF MEGLUMINE IODIPAMIDE (BILIGRAFIN) IN DUBIN-JOHNSON SYNDROME. (E.) Morita, M. (Okayama U. Med. Sch., Japan) and T. Kihara. *Radiology* 99(1):57-60, 1971.

Intravenous cholecystography with rapid i.v. injection of 20 ml of 50% iodipamide (Biligrafin) was performed in 7 patients with Dubin-Johnson syndrome. Good opacification of the gallbladder was seen in 6 of the patients after about 6 hr, but none showed visualization of the bile ducts. The elimination curve, based on the injection of 4 patients with a mixture of 20 ml iodipamide and 100 μC ^{125}I-iodipamide, showed that this agent was retained for a long period of time. It is concluded that this extended time period necessary for successful cholecystography is another feature of the Dubin-Johnson syndrome.

2107 PROPERTIES AND DISTRIBUTION OF LIVER FLUORESCENCE IN PORPHYRIA CUTANEA TARDA (PCT). (E.) Enerbäck, L. (U. Goteborg Dept. Pathol., Sweden) and O. Lundvall. *Virchows Arch. Pathol. Anat.* 350(4):293-302, 1970.

Livers of 19 patients with symptomatic porphyria cutanea tarda (5 with clinically manifest disease) exhibited red fluorescence of the porphyrin-type which varied in intensity and distribution; this fluorescence was found both in single liver cells obtained by fine needle aspiration and in sections from conventional thick needle biopsies. An advantage of fine needle biopsy specimens is that smears can be used directly without further treatment. Porphyrins were freely diffusable in liver cells; easily extracted by water or water-containing media; were only slightly soluble in ethanol and xylene; but were very soluble in formalin, as indicated by fluorescence intensity of smears before and after immersion in those media. Freeze-drying and ethanol-fixation were ideal methods for the study of this highly diffusible material, but only if the sections were flattened in the dry state. When the diffusion of porphyrins was prevented by water-free techniques, porphyrins were confined to liver cell cytoplasm, and the nuclei appeared as nonfluorescent spots. In sections floated on water, a redistribution of the fluorescent material occurred, which was now found in the nuclei of liver cells, red blood cells, and the collagen stroma of the portal areas. The simple method of direct fluorescence microscopic examination of aspiration biopsy smears may be useful as a diagnostic procedure in cases of porphyria cutanea tarda.

2108 RADIOCINEMATOGRAPHY IN THE FOLLOW-UP OF SURGICALLY-TREATED ESOPHAGEAL ATRESIA. (Fr.) Beraud, C. (Debrousse Hosp., Lyon, France), D. Cruaud, M. Garnier and A. Lacout. *Lyon Med.* 224(43):927-930, 1970.

2109 RADIOCINEMATOGRAPHY IN DISEASES OF THE CARDIA. (Fr.) Saintes Lekeux, M. *Scalpel* 123(17):301-302, 1970.

2110 RADIOLOGICAL EXAMINATION OF THE ESOPHAGUS, STOMACH, AND DUODENUM DURING HEMORRHAGE. I. TECHNIQUE AND INDICATIONS IN A SERIES OF 300 PATIENTS. (Fr.) Nahum, H. (Beaujon Hosp., Clichy, France), B. Rueff and G. Cazard. *Presse Med.* 78(54):2414-2416, 1970.

2111 GASTROCAMERA STUDIES AND AIMED GASTROBIOPSY. (Rev.) (Ger.) Witte, S. (Lutheran Hosp., Karlsruhe, Germany). *Dtsch. Med. Wochenschr.* 95(32):1659, 1970.

2112 CYTOLOGICAL STUDIES IN THE DIAGNOSIS OF STOMACH DISEASE. (Rus.) Loukina, T. A. and E. A. Rokhline. *Lab. Delo* (12):723-725, 1970.

2113 EARLY CYTOLOGICAL DIAGNOSIS OF GASTRIC CANCER. (Rus.) Viljavine, G. D., O. S. Serguel and E. K. Egorova. *Lab. Delo* (12):726-729, 1970.

2114 SCINTISCANNING WITH RADIOTECHNETIUM IN THE STUDY OF GASTRIC CARCINOMA. (It.) Di Maggio, C. (U. Padua Inst. Radiol., Italy), S. Romani and R. Ravasini. *Quad. Radiol.* 35(2-3-4): 279-302, 1970.

2115 STOMACH UPTAKE SIMULATING TUMOR FOLLOWING THE INTRAARTERIAL INJECTION OF ^{75}Se-SELENOMETHIONINE. (E.) Quinn, J. L. (Northwestern U. McGaw Med. Ctr., Chicago, Ill.), E. J. Nudelman and G. Cummins. *Radiology* 98(2):341-342, 1971.

2116 DATA ON THE X-RAY DIAGNOSIS OF EARLY CANCER OF THE STOMACH. (Hun.) Hajdu, I., I. Balogh and S. Forgacs. *Magy Onkol.* 14(3):129-133, 1970.

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2118 GASTRODUODENAL RADIOLOGICAL CHANGES IN PEPTIC ULCER AND CHOLELITHIASIS. (Rum.) Radulescu, D. (1st Med. Clin., Cluj, Rumania). *Oncol. Radiol.* 9(4):325-330, 1970.

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See also numbers: 1872, 2336, 2430, 2431

GASTROINTESTINAL DISEASES

ESOPHAGUS

2186 GASTROPLASTY AND BELSEY HIATUS HERNIA REPAIR. AN OPERATION FOR THE MANAGEMENT OF PEPTIC STRUCTURE WITH ACQUIRED SHORT ESOPHAGUS. (E.) Pearson, F. G. (Toronto Gen. Hosp., Ontario, Canada), B. Langer and R. D. Henderson. *J. Thorac. Cardiovasc. Surg.* 61(1):50-63, 1971.

The operative technique and follow-up study (3 months to 5.5 yr after surgery) of 24 patients with irreducible hiatus hernia, peptic esophagitis, and acquired short esophagus managed by a modification of Collis' gastroplasty and Belsey hernia repair, are reported. Twenty-three of the 24 had dysphagia caused by peptic stricture, and in 11 patients the stenosis was long, fibrous, and severe. Results of treatment were evaluated by clinical symptoms, esophagoscopy, cine-esophagography, esophageal manometry studies, and pH studies. The procedure prevents gastroesophageal reflux, effectively allowing peptic esophagitis to resolve rapidly with stricture and scar contracture resolving more slowly. The need for pre-, intra-, and postoperative dilatation is emphasized. The condition of all patients was improved; in 22, symptomatic reflux was abolished, and a completely normal subjective swallowing mechanism was restored in 17 patients. The operation is technically simpler and safer than esophageal resection with bowel interposition and does not require vagotomy and pyloroplasty.

2187 THE HIATAL HERNIA-REFLUX COMPLEX. CURRENT APPROACHES TO CORRECTION AND EVALUATION OF RESULTS. (E.) Moran, J. M. (Tufts U. Sch. Med., Boston, Mass.), C. O. Pihl, R. A. Norton and H. F. Rheinlander. *Am. J. Surg.* 121(4):403-411, 1971.

Experience with 40 cases in which Belsey and Nissen fundiplication operation was performed for hiatus hernia-reflux complex is reviewed with correlation of the pre- and postoperative state with esophageal manometry. Results were graded objectively with evaluation of heartburn, regurgitation, dysphagia, and bleeding. Most cases were complicated by stricture, ulceration, bleeding, aspiration, or previous repair. Follow-up studies (clinical and radiographic) were made from 6-48 month postoperatively. Recurrent hernia with reflux developed in 1 patient. Late stricture was treated by simple correction of reflux combined with intraoperative dilatation, with 8 of 10 initial successes; 2 patients required further treatment. The mean lower esophageal sphincteric pressure was improved by fundiplication, but its importance in preventing reflux postoperatively is secondary to the creation of an effective valve at the gastroesophageal junction. Selected patients with symptomatic esophageal reflux can be offered operative repair with assurance that the risk is small and the results generally good.

2188 HIATAL HERNIA IN INFANTS AND CHILDREN: RESULTS OF SURGICAL TREATMENT. (E.) Rohatgi, M., B. Shandling (Hosp. Sick Child., Toronto, Ontario, Canada) and C. A. Stephens. *Surgery* 69(3):456-462, 1971.

Subjects consisted of 86 children less than 13 yr old who were operated for hiatus hernia and followed-up for 4 months to 15 yr postoperatively. Diagnosis was made in 5 by history, physical symptoms, and esophagoscopy. In 81 undergoing barium swallow, results were positive for hiatus hernia in 64, equivocal in 8 (3 with esophageal stricture, 3 with demonstrable reflux only, and 2 with neither stricture nor reflux), and negative in 9 (1 with stricture, 7 with demonstrable reflux). Esophagoscopy was performed in 75, and was positive for hiatus hernia in 67, doubtful in 5, and negative in 3. The indications for surgery were as follows: stricture; chronic bleeding; symptomatic large hernia and failure of conservative management, which was indicated by persistent vomiting; recurrent aspiration pneumonia; cyanosis; failure to thrive; and persistent esophagitis. The operative approach was abdominal in 77, thoracic in 8, and thoracoabdominal in 1 patient. Surgery was performed by many surgeons who attempted to reduce hernia, reconstruct the hiatus, fix the esophagus to the margins of the narrowed hiatus, create an acute angle at the esophagocardiac junction, and plicate the fundus around the abdominal esophagus. Of the 86 children, 56 were subjected to hernia repair only, 12 to repair plus gastrostomy, 8 to repair plus pyloroplasty and gastrostomy, and 8 to all three procedures plus vagotomy; 2 were treated by gastrostomy only. Late results were assessed in the 56 patients. There were 10 initially unsatisfactory results, 6 of which underwent further surgery. Of the 6, 5 are now considered satisfactory. Of the other 5 patients, 3 are quite asymptomatic despite radiology evidence of recurrence. Two deaths were attributed to postoperative complications.

2189 RELATIONSHIP BETWEEN POSTERIOR PHARYNGEAL POUCH AND HIATUS HERNIA. (E.) Smiley, T. B., P. K. Caves (Brompton Hosp., London) and D. C. Porter. *Thorax* 25(6):725-731, 1970.

Thirty-four patients (23 males and 11 females) with known pharyngeal pouches were examined by barium contrast studies. Hiatus hernia was diagnosed in 32 of the 34 patients. Six illustrative case histories and a review of published work on cricopharyngeal function are also presented to support the view that gastroesophageal reflux is the primary factor leading to cricopharyngeal dysfunction, which subsequently leads to the formation of a pharyngeal pouch in some cases. The treatment of choice for the pharyngeal pouch is regarded as a 1-stage xcision with division of the cricopharyngeus. iatus hernia is also repaired in patients with emonstrable reflux. In patients with small ouches, repair of the hiatus hernia alone may be ufficient.

190 MANAGEMENT OF BLEEDING OESOPHAGEAL VARICES BY DRAINING LYMPH FROM THE HORACIC DUCT. (E.) Datta, D. V. (Postgrad. nst. Med. Ed. Res., Chandigarh, India), S. A. K. ingh, B. S. Patra, V. K. Saini and P. N. hhuttani. *Gut* 12(1):48-50, 1971.

he effect of draining lymph from the thoracic uct on bleeding from esophageal varices was tudied in 6 patients who had active bleeding rom varices associated with portal hypertension fter routine measures failed. In 5 patients, leeding did not stop, nor was there any change n intrasplenic pressure, following this procedure. leeding stopped in 1 patient after thoracic duct ymph drainage for 9 hr when other measures had ailed to control it. All 6 patients eventually ied, 4 from massive hemorrhage and hepatic coma, nd 2 from complications associated with surgery or this disorder.

191 NEAR-TOTAL ESOPHAGEAL EXCLUSION BY CERVICAL ESOPHAGOSTOMY AND TUBE ASTROSTOMY IN THE MANAGEMENT OF MASSIVE ESOPHAGEAL ERFORATION: REPORT OF A CASE. (E.) Menguy, R. U. Rochester Dept. Surg., N. Y.). *Ann. Surg.* 73(4):613-616, 1971.

uring pneumatic dilation for achalasia of the ower esophageal sphincter, a 26-yr-old woman ustained a massive esophageal laceration extending rom just above the diaphragmatic hiatus to just elow the aortic arch. The tear was entirely losed in 2 layers of interrupted sutures and losed chest drainage of the mediastinum was nstituted. Because of the unusual length of the ear and the poor condition (edematous, friable) f the esophageal tissues, a near-complete sophageal exclusion was performed. This was ccomplished distally by constructing a tube astrostomy with a Foley catheter. Proximally, he cervical esophagus was mobilized through a eft-sided oblique incision and a loop esophagostomy as constructed. Esophageal lacerations owe heir extreme gravity to the fact that a wide ariety of aerobic and anaerobic organisms grow uxuriantly in human saliva. Diversion of this alivary stream by loop cervical esophagostomy s necessary during the wound-healing stage of he suture repair.

192 EARLY DIAGNOSIS OF ESOPHAGEAL PERFORATION. (Ger.) Minnigerode, B. (U. Gottingen ar Nose Throat Clin., Germany). *HNO* 18(8): 53-255, 1970.

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2194 AUTOPSY CASE OF TRAUMATIC DIAPHRAGMATIC HERNIA. (Jap.) Ito, K. (Kyushu U. Sch. Med., Fukuoka, Japan), K. Yamamoto and M. Kikuchi. *Nippon Naika Gakkai Zasshi (J. Jap. Soc. Intern. Med.)* 59(5):432-437, 1970.

2195 ESOPHAGEAL RUPTURE SECONDARY TO PYLORIC OBSTRUCTION BY A GASTROSTOMY FOLEY CATHETER BALLOON. (E.) Frech, R. S. (Washington U. Sch. Med., St. Louis, Mo.), C. Roper and W. H. McAlister. *J. Can. Assoc. Radiol.* 21(4):263-265, 1970.

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2198 ESOPHAGEAL NEOPLASMS. (Sp.) Tuca-Barcelo, L. *An. Med. (Espec.)*56(3): 266-281, 1970.

2199 COMBINED CHEMICAL AND RADIOLOGICAL TREATMENT OF PATIENTS WITH ESOPHAGEAL CANCER. (Rus.) Balmukhanov, S. B. (Res. Inst. Oncol., Alma-Ata, USSR), A. I. Tsoi and N. I. Dementieva. *Vopr. Onkol.* 16(6):7-14, 1970.

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2201 DOSE MEASUREMENTS IN OESOPHAGUS IN COBALT^{60} ROTATION THERAPY. (E.) McEwan, A. C. (U. Cambridge Dept. Radiotherapeut., England) and T. K. Wheeler. *Acta Radiol.* [*Ther.*] *(Stockh.)* 9(6):618-621, 1970.

2202 RADIOTHERAPY IN LYMPHOGRANULOMATOUS ESOPHAGEAL FISTULAS. (Rev.) (Ger.) Hoffmann, K. (U. Tubingen Med. Radiol. Inst., Germany). *Strahlentherapie* 140(3):268-272, 1970.

2203 PSEUDOTUMORAL ESOPHAGEAL VARICES ASSOCIATED WITH PORTAL HYPERTENSION. (E.) Jonsson, K. (Univ. Hosp., Lund, Sweden) and R. L. Rian. *Radiology* 97(3):593-597, 1970.

2204 BLEEDING ESOPHAGEAL VARICES DUE TO SPLENIC ARTERIOVENOUS FISTULA. (E.) Nissan, S. (Cent. Emek Hosp., Afula. Israel) and J. A. Bar-Maor. *Am. J. Gastroenterol.* 55(4): 379-386, 1971.

2205 ESOPHAGEAL DIVERTICULA IN TWO BROTHERS. (Fr.) Poncet, P. *Ann. Otolaryngol. Chir. Cervicofac.* 87(9):614-615, 1970.

2206 ESOPHAGOSCOPY AND DILATATION IN PEPTIC ESOPHAGEAL STENOSIS IN CHILDREN. (Sl.) Steller, F. (City Pediatr. Hosp., Bratislava, Czechoslovakia). *Bratisl. Lek. Listy* 54(3): 341-345, 1970.

2207 TREATMENT OF ESOPHAGEAL STRICTURE SECONDARY TO BURNS BY LIDASE ELECTROPHORESIS AND SIMULTANEOUS DILATATION WITH TUBES FROM HETEROGENEOUS PERITONEUM. (Rus.) Bitsadze, L. R. and K. A. Ananieva. *Vestn. Otorinolaringol.* 33(1):101-104, 1971.

2208 RECONSTRUCTION OF THE ESOPHAGUS BY PRETHORACIC SKIN GRAFT. (Fr.) Pierre, M. (38 Blvd. Perier, Marseille, France). *Chirurgie* 96(10):644-647, 1970.

2209 ELECTIVE REPAIR OF ESOPHAGEAL HIATAL HERNIAS AT THE TIME OF CHOLECYSTECTOMY. (E.) Block, M. A. (Henry Ford Hosp., Detroit, Mich.) and H. M. Allen. *Surg. Gynecol. Obstet.* 132(1):46-50, 1971.

2210 TREATMENT OF SLIDING ESOPHAGEAL HIATAL HERNIA. CASE REPORTS. (E.) Geha, A. S. (Jewish Hosp. St. Louis, Mo.) and A. E. Baue. *Mo. Med.* 68(1):35-43, 1971.

2211 HIATAL HERNIA AND LESIONS OF THE ESOPHAGOGASTRIC JUNCTION. (Sp.) Valencia-Parparcen, J. (Univ. Sch. Med., Caracas, Venezuela) and G. D'Escrivan. *G.E.N. (Caracas)* 25(1):55-69, 1970.

2212 HIATUS HERNIA IN ADULTS. CLINICAL AND RADIOLOGICAL DIAGNOSIS. (Ger.) Prochnow, R. (Radiol. Inst., Potsdam/Babelsberg, Germany) and E. Wiedau. *Dtsch. Gesundheitsw.* 25(38):1795-1802, 1970.

2213 MEDICAL AND DIETARY TREATMENT OF HIATUS HERNIA IN ADULTS. (Rev.) (Fr.) Dupuy, R. (Beaujon Hosp., Clichy, France). *Gaz. Med. Fr.* 77(26):5517-5524, 1970.

See also numbers: 2108, 2109, 2110, 2605, 2666

2214 NATURAL HISTORY AND SURGICAL DILEMMA OF "STRESS" GASTRIC BLEEDING. (E.)
ucas, C. E., C. Sugawa, J. Riddle, F. Rector, B. Rosenberg and A. J. Walt (Wayne State U. Sch. ed., Detroit, Mich.). *Arch. Surg.* 102(4):266-273, 1971.

Records of more than 300 patients transfused for gastric bleeding in association with multiple organ injury or severe sepsis were reviewed in an attempt to outline a plan of management. Of hese patients, 38 had bleeding which could not e controlled by ice-saline lavage and had to undergo surgery. Eighteen of these patients ied. In all 42 patients who were observed ithin 24 hr of severe trauma and who later died, erial photographs revealed a wide spectrum of erosions limited to the gastric fundus. In most atients studied, gastric hypersecretion was evident (average 3.6 mEq/hr). Arterial CO_2 ressure values were variable, but were usually ecreased in response to the hyperventilation of epsis. Gastric mucin analysis in 10 stress and 1 control patients showed a 10-fold increase in he total weight or absolute amount of non-ialyzable substance in stress patients. emorrhage was most effectively controlled by agotomy and distal gastrectomy when surgery was equired. Altered surface epithelial cells were lso evident when the gastric mucosa was examined ith a scanning electron microscope.

215 A GASTRIC LAVAGE ASSEMBLY FOR RAPID EVACUATION OF THE STOMACH. (E.)
dlich, R. F. (U. Minnesota Health Sci. Ctr., inneapolis). *Am. J. Dig. Dis.* 16(2):160-163, 971.

he rapid evacuation of blood clots or pills rom the stomach was attempted using a recently eveloped gastric lavage assembly. The inner iameter of the lumen of the plastic syringe was ive times greater than that of the standard lass urethral syringe, thus permitting signifi- antly larger particles to be evacuated. The apacity of the plastic syringe was 100 ml as ompared to 60 ml for the glass syringe. In 50 atients who either had upper gastrointestinal leeding or had ingested poisons and were ntubated with the new gastric lavage tube, rrigation with 3 liters of 0.85% iced saline was ccomplished within 10 min. The assembly did not ot become plugged with particulate matter during ny of the procedures.

216 PYLORIC INCOMPETENCE IN CHRONIC NON-SPECIFIC LUNG DISEASE. (E.) Beeley, . (Northern Gen. Hosp., Sheffield, England) and . Grech. *Gut* 12(2):102-106, 1971.

ubjects consisted of 19 patients (18 males) with onspecific chronic lung diseases (including chronic bronchitis, emphysema, bronchiectasis, pneumoconiosis, and asthma) chosen without consideration of dyspepsia. Of the 19 patients, 17 (89%) showed pyloric incompetence in the standing position, which usually disappeared in a supine position; in the majority, the duodeno-gastric reflux of barium was moderate (in 13) or severe (in 3). None of the patients had evidence of gastroesophageal reflux. One who had a gastric ulcer and moderate pyloric reflux showed a decrease in the degree of reflux when the ulcer healed. Symptoms of dyspepsia were present in 12, but there was little correlation between these symptoms and the degree of pyloric reflux. A study of arterial pH, oxygen pressure, and CO_2 pressure showed that while most patients had some abnormalities, 2 with reflux showed no such changes, and 2 with no reflux had marked pulmonary failure and were acidotic. All patients had evidence of obstructive lung disease. Neither clubbing nor the presence of right-sided heart failure was correlated with the presence of reflux. Four were receiving steroids and 17 were receiving bronchodilators (the 2 patients not on bronchodilators both showed reflux).

2217 EXPERIENCE WITH 1,079 CASES OF CANCER OF THE STOMACH SEEN IN KOREA FROM 1962 TO 1968. (E.) Crane, P. S. (602 Gallatin Rd., Nashville, Tenn.), S. U. Rhee and D. J. Seel. *Am. J. Surg.* 120(6):747-751, 1970.

The frequency of carcinoma of the stomach was very high when compared with other cancers seen in a rural Korean mission hospital. The peak age for male and female patients with gastric cancer was 52 and 42 yr, resp. The male to female ratio was 3:1. Most patients with stomach cancer were farmers. A study made of the diets of these cancer patients showed that patients with stomach cancer seemed to have a significantly higher intake of soya paste than patients of the same age and sex who did not have stomach cancer. Recent studies have indicated that *Aspergillus flavus*, a mold found in soybean samples, is a source of highly carcinogenic aflatoxins. This mold may be a possible etiologic factor in the high incidence of stomach cancer seen in Southwest Korea.

2218 INTESTINAL METAPLASIA OF GASTRIC MUCOSA IN AUTOPSY MATERIALS IN HIROSHIMA AND YAMAGUCHI DISTRICTS. (E.) Kubo, T. (Kyushu U. Cancer Res. Inst., Fukuoka, Japan) and T. Imai. *Gann* 62(1):49-53, 1971.

Previous literature has shown that the incidence of gastric cancer is constantly high within the population where intestinal metaplasia appears to be frequent. The Tokyo and Hiroshima-Yamaguchi districts, which exhibited almost equal mortality from gastric cancer, also revealed an equivalent tendency towards a high incidence of intestinal metaplasia. In the present study, there was a constant increase in the incidence of intestinal metaplasia with age; lesions were prevalent among the majority of Japanese over 40 yr of age.

2219 PROTEINS IN GASTRIC JUICE: A STUDY OF FIFTY CASES. (E.) Faulk, W. P., J. A. Rider (Franklin Hosp. Found., San Francisco, Calif.) and J. I. Swader. *J. Lab. Clin. Med.* 77(2):228-238, 1971.

Proteins in the gastric juices from 20 normal volunteers and 30 patients with ulcer, gastritis, or neoplasia were investigated. Blood loss into the stomach was assessed by visual inspection and tests for the presence of methemalbumin, haptaglobin and hemoglobin. Thirty-three of 50 gastric samples were listed as not showing blood; however, there was an absence of hemoglobin peroxidase staining in only 5 of these. Total LDH values were insignificantly increased in patients with uncomplicated ulcers. Intermediate values were recorded for gastritis, and markedly increased values were observed in patients with gastric malignancies. Consistent isoenzyme (LDH) patterns characteristic of specific gastric disease were not found. Total gastric juice protein and specifically, gastric albumin increased with gastric disease, while gastric globulins decreased, suggesting that the albumin: globulin ratio may be of use in distinguishing normalcy from disease. Immunoelectrophoretic studies of gastric juice indicated the presence of serum proteins, as well as gastric specific components. An increased appearance of large molecules such as α_2-macroglobulin, IgM, and β-lipoprotein was seen during inflammation or pathological activity. Other plasma proteins in gastric juice included α_1-antitrypsin, Gc proteins, β_2-glycoprotein, parotin-P, and the complement components β_1A, β_1C, and β_1E. The concentrations of β_2-glycoprotein, ceruloplasmin, α_2-macroglobulin, IgM, and β-lipoprotein were increased in patients with ulcer, gastritis, or neoplasia.

2220 THE EFFECTS OF ETHANOL ON THE DEVELOPMENT OF GASTRIC ULCERATION IN THE RAT. (E.) Schmidt, K. M. (Santa Clara U., Calif.), J. A. Kangas and G. F. Solomon. *J. Psychosom. Res.* 15(1):55-61, 1971.

In a study of the effects of alcohol on stomach ulcers, Sprague-Dawley rats were administered ethanol in various dosage schedules. Analysis of variance demonstrated no difference in the degree of ulceration among the 10% alcohol and dextrose groups, or the 20% alcohol groups and the deprivation/lucite barrier groups. In studying the effect of length of stress period (4, 8, and 10 days) on ulceration, there were significant differences between 4 and 8 days (an observed increase) and 8 and 10 days (a decrease). There was no significant correlation between weight loss and ulceration. Apparently, there was an increased gastric acid production due to alcohol dosages, but alcohol probably does not contribute to ulceration in any of its stages of development. Also, alcohol does not interfere with the healing of developed ulceration since there was decreased ulceration between the 8 and 10 day period; this suggests that not only is there a diminution of ulcer development, but there can be healing of ulcers during alcohol treatment and food and water deprivation.

2221 DOUBLE-BARREL GASTROJEJUNAL STOMA AND ITS SYMPTOMS AND COMPLICATIONS IN 38 PATIENTS. (E.) Demaret, A., B. I. Hirschowitz (U. Alabama Med. Sch., Birmingham) and G. C. Luketic. *Scand. J. Gastroenterol.* 6(1):77-86, 1971.

Symptoms and complications of 38 patients with a double-barrel gastrojejunal stoma (an unintended arrangement of the stoma after gastrojejunostomy with or without resection in which the afferent and efferent loop orifices appear side by side, and are completely separated by a bridge of jejunal mucosa level with the gastric margins), which had been diagnosed endoscopically, are reported. This anomaly was associated with a high incidence of bleeding, recurrent ulceration, pain, vomiting, dumping, and diarrhea; it was probably the main cause of afferent loop distension and stasis. Marked improvement was observed in 75% of those with successful revision of the stoma; however, 85% of the patients not having stomal revision were unchanged or worse.

2222 RADIOIMMUNOASSAY OF GASTRIN: STUDIES IN PERNICIOUS ANAEMIA. (E.) Hansky, J. (Monah U. Dept. Med., Melbourne, Australia), M. G. Korman, C. Soveny and D. J. B. St. John. *Gut* 12(2):97-101, 1971.

Subjects consisted of 21 patients with Addisonian pernicious anemia who had a mean fasting serum gastrin level of 1036±215 pg/ml, as compared to a normal level of 0-120 pg/ml observed for 60 controls. Only 1 of the 21 patients had a level in the normal range, while levels in the others ranged from 190-5000 pg/ml. The single patient with normal serum gastrin levels was 1 of 2 (the other with a level of 700 pg/ml) in the group with no detectable gastric parietal cell antibodies. In 5 subjects, 0.9% saline was infused into the stomach through a nasogastric tube at a rate of 100 ml in 30 min.; this was then aspirated and followed by infusion of 0.1 N HCl at the same rate, which was not aspirated. In 4 of the 5 patients, there was a mean decrease of 30% during saline perfusion, and a further decrease to 35% of basal levels during acid perfusion; the 5th patient had normal gastrin levels which fell to zero with acid perfusion. Another 2 patients underwent serial perfusion of the stomach with solutions at pH values of 8, 6, 5, 4, 2 and 1.

In 1 patient, there was a marked decrease in gastrin levels when the acidity of the gastric perfusate was changed from pH 6 to 4, while in the 2nd there was a slight decrease between pH 6 and 5, and a marked fall between pH 5 and 4. In 4 other patients, gastrin levels were measured during the hr following a single i.v. injection of 2 units/kg secretin. The mean fall in serum gastrin was 44±15% of basal levels, and the lowest serum level of gastrin occurred at 10, 20, 30, and 45 min. resp., after secretin injection. Another 4 patients were observed during a 1-hr constant i.v. infusion of 2 units/kg secretin. The mean fall in serum gastrin was 35±4% of basal levels, and the lowest level occurred after 30 min in 1 patient and after 45 min in the other 3.

2223 FINE STRUCTURE OF XANTHELASMA OF THE STOMACH. (E.) Takebayashi, S. (Nagasaki U. Sch. Med., Japan). *Acta Pathol. Jap.* 20(3): 357-363, 1970.

Electron microscopy was performed on 2 specimens of xanthelasma of the stomach obtained at surgery, and from 5 surgical specimens without yellow spots or other macroscopic changes (controls) from patients with gastric carcinoma or ulcer disease. The foam cell of xanthelasma of the gastric mucosa was a lipid-laden histiocyte with a number of microvilli measuring approximately 0.1 μ in width and 2-3 μ in length. In the cytoplasm, a number of lipid particles of vacuolar and osmophilic type were noted, with the vacuolar type being more frequent. Lipid particles were also observed in the plasma cells, pericytes, and smooth muscle cells; all were the vacuolar type. It was concluded that the lipid accumulation in the cytoplasm in xanthelasma is not entirely caused by phagocytosis, but by localized changes in lipid metabolism.

2224 BIOLOGY OF GASTRIC CANCER. (Rev.) (It.) Sirtori, C. (Gaslini Inst., Genoa, Italy). *Minerva Med.* 61(69):3575-3577, 1970.

2225 INDUCTION OF CANCER BY 20-METHYLCHOLANTHRENE IN DIFFERENT REGIONS OF THE RAT STOMACH. (E.) Arkhipov, G. N. (Inst. Nutr. Moscow). *Cancer Res.* 30(11):2739-2743, 1970.

2226 LEIOMYOBLASTOMA. AN UNUSUAL TUMOR OF STOMACH. (E.) Broderick, P. A. (Tufts U. Sch. Med., Boston, Mass.) and S. R. Allegra. *RI Med. J.* 53(7):386-389, 1970.

2227 LARGE LEIOMYOSARCOMA OF THE STOMACH CARDIA TREATED BY GASTRIC REMNANT INTERPOSITION. (E.) Case, T. C. (530 Park Ave., New York, N. Y.). *J. Am. Geriat. Soc.* 19(1): 86-91, 1971.

2228 PRIMARY GASTRIC SARCOMA. PRESENTATION OF FIVE CASES. (Por.) Rosenberg, D. (Natl. U. Sch. Med. Sci., Campinas, Brazil), R. Raposo Medeiros, M. Mantovani and R. Wilson Vieira. *Rev. Assoc. Med. Bras.* 16(10):361-370, 1970.

2229 GASTRIC CANCER. PATHOLOGICAL ANATOMY OF 328 CASES STUDIED AT THE INSTITUTE OF PATHOLOGIC ANATOMY OF COIMBRA. (Por.) De Azevedo Correia Trincao, R. (Inst. Pathol. Anat., Coimbra, Portugal) and M. I. Baptista Martins. *Arch. Patol. Ger. Anat. Patol. Univ. Coimbra* 10:49-90, 1970.

2230 ANALYSIS OF 166 CASES OF STOMACH CANCER FROM MAISONNEUVE HOSPITAL. (Fr.) Béliveau, D. (Maisonneuve Hosp., Canada) and J. Lassonde. *Union Med. Can.* 100(5):940-945, 1971.

2231 CLINICAL EVALUTION OF TOTAL GASTRECTOMY FOR GASTRIC CANCER. (Jap.) Kurata, Y. (Tohoku U. Med. Sch., Sendai, Japan). *Tohoku Igaku Zasshi (Tohoku Med. J.)* 81(4):186-198, 1970.

2232 CASE OF RECURRENT CANCER SIX YEARS AFTER RESECTION OF A TYPE I EARLY CARCINOMA. (Jap.) Okui, K. (U. Chiba 1st Dept. Surg., Japan). *Stomach Intest. (Tokyo)* 5(5): 587-592, 1970.

2233 ANGIOGRAPHY IN A CASE OF CARCINOID TUMOUR IN THE STOMACH. (E.) Andersen, J. B. (Municipal Hosp., Aarhus, Denmark), B. Madsen and H. Skjoldborg. *Br. J. Radiol.* 44(519):218-220, 1971.

2234 SYNDROMES AFTER STOMACH SURGERY. (Rev.) (It.) Zilli, E. (St. Sebastiano M. Frascati Hosp., Rome). *Policlinico [Prat.]* 77(27):871-885, 1970.

2235 ALIMENTARY (POSTGASTRECTOMY) HYPOGLYCEMIA. A REMEDIABLE CAUSE OF RECURRENT SEIZURES. (E.) Burton, R. A. (U. California Sch. Med., San Francisco) and N. H. Raskin. *Arch. Neurol.* 23(1):14-17, 1970.

2236 STUDY OF VITAMIN B_{12}-CO^{58} METABOLISM BY THE WHOLE-BODY RADIOMETRIC TECHNIQUE AFTER RESECTION OF THE STOMACH. (Rus.) Kaplan, M. A., R. I. Gabunila and B. A. Berdov. *Med. Radiol. (Mosk.)* 15(11):34-39, 1970.

2237 HISTOPATHOLOGICAL STUDIES ON TISSUE MAST CELLS AFTER STOMACH RESECTION. (Jap.) Kataoka, T. (U. Showa Sch. Med., Japan). *J. Showa Med. Assoc.* 30(3):10-30, 1970.

2238 SURGERY FOR GASTRIC POLYPS AT SURGICAL CLINIC I-a. (Rum.) Dragomir, D. (Inst. Med., Iasi, Rumania), I. Jitaru and E. Veisa. *Rev. Med. Chir. Iasi* 74(2):365-370, 1970.

2239 SPONTANEOUS RUPTURE OF THE STOMACH FOLLOWING INGESTION OF SODIUM BICARBONATE. (E.) Zer, M. (Beilinson Hosp., Petah Tikva, Israel), C. Chaimoff and M. Dintsman. *Arch. Surg.* 101(4):532-533, 1970.

2240 CHRONIC STOMACH VOLVULUS IN A 13-YEAR-OLD CHILD. (Rus.) Shemitov, B. F. and O. P. Mineev. *Zdravookhr. Beloruss.* 16(10): 89, 1970.

2241 GASTRIC VOLVULUS CAUSING RUPTURE OF THE SPLEEN. (E.) Hudspeth, A. S. (Wake Forest U. Bowman Gray Sch. Med., Winston-Salem, N. C.) and J. M. Mcwhorter. *Arch. Surg.* 102(3): 232-233, 1971.

2242 ECTOPIC PANCREATIC TISSUE IN THE GASTRIC WALL. (Rev.) (Jap.) Nagayo, T. (Aichi Cancer Ctr., Nagoya, Japan). *Stomach Intest. Tokyo* 5(11):1425-1428, 1970.

2243 SUBCARDIAL GASTRIC DIVERTICULA. (It.) Dragone, G. (U. Cagliari Inst. Gen. Clin. Surg., Italy) and G. P. Farina. *Rass. Med. Sarda* 73(3):239-247, 1970.

2244 MENETRIER'S DISEASE. REPORT OF A CASE WITH REVIEW OF THE LITERATURE. (Rev.) (E.) Mahmood, L. (Howard U. Dept. Hematol., Washington, D. C.), N. Ali and E. C. Nash. *Med. Ann. D.C.* 39(8):433-436, 1970.

2245 LIMITED HYPERTROPHIC GASTRITIS (MENETRIER'S DISEASE). (Rus.) Grakovskaia, G. D. *Klin. Khir.* (8):47, 1970.

2246 TWO CASES OF STOMACH PARALYSIS IN DIABETES. (Fr.) Schrub, J. C. (Bois Guillaume Hosp. Rouen, France), B. Hillemand and A. Petit. *Ann. Med. Interne* 121(11):961-964, 1970..

2247 GASTRIC ACID AND ELECTROLYTE OUTPUT IN NORMAL INDIVIDUALS AND IN PATIENTS WITH DYSPEPSIA AND GASTRITIS AFTER "HIGH DOSE" HISTAMINE STIMULATION. (Fr.) Ligny, G. (City Hosp., Charleroi, Belgium) and J. Manouiloff. *Acta Gastroenterol. Belg.* 33(8-9):616-621, 1970.

2248 CHRONIC GASTRITIS AS SEEN BY BIOPSY. (Ser.) Davcev, P. (Med. Sch., Skopje, Yugoslavia), D. Arsov and B. Vanovski. *Med. Glas.* 24(3):114-120, 1970.

See also numbers: 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2119, 2255, 2292, 2377, 2434, 2605, 2644, 2646, 2684

PEPTIC ULCERS

2249 BILE REGURGITATION AND GASTRIC ULCER. (E.) Isaza, J. (U. Florida Coll. Med., Gainesville), E. R. Woodward and L. R. Dragstedt. *Surgery* 69(3):441-444, 1971.

The possibility of a relation between gastrin-stimulated gastric secretion and bile regurgitation, as well as peptic ulcer development, was studied. Four mongrel dogs were prepared with a gastric fistula by insertion of a stainless steel Dragstedt cannula 5 inches proximal to the pylorus and close to the greater curvature, and experiments were begun 4 weeks later. After a 24-hr fast and a 1-hr period of negative gastric secretion, dogs were subjected to either continuous i.v. infusion of pentagastrin (0.5 µg/kg/hr) for 90 min, continuous i.v. infusion of histamine phosphate (0.03 mg/kg/hr) for 90 min, or a single rapid i.v. injection of 2-deoxy-D-glucose in a dose of 150 mg/kg dissolved in 15 ml of saline. The gastric secretory response to histamine and pentagastrin rose logarithmically over the 90-min infusion period, and then fell to control levels within 30-45 min, while the response to 2-deoxy-D-glucose peaked (at a lower level than with other stimulants) within 20 min, and tapered off very gradually; it still was somewhat elevated at 3 hr. Bile regurgitation was seen in 17 of 30 pentagastrin, 6 of 30 histamine, and 5 of 28 2-deoxy-D-glucose experiments; the difference between pentagastrin and the other stimulants was significant. Vagotomy did not significantly influence bile regurgitation in dogs receiving pentagastrin.

2250 RETROPERITONEAL PERFORATION OF DUODENAL ULCERS WITH ABSCESS FORMATION: REPORT

OF FOUR CASES AND SURVEY OF THE LITERATURE. (E.) Hashmonai, M. (Rambam Govt. Hosp., Haifa, Israel), J. Abrahamson, D. Erlik and A. Schramek. *Ann. Surg.* 173(3):409-414, 1971.

Four patients were admitted to the hospital and underwent surgery for retroperitoneal perforation of duodenal ulcer with abscess formation. Lack of previous history of peptic ulcer disease did not exclude this possibility since in 2 of the cases, retroperitoneal perforation of the ulcer was the initial sign. Epigastric pain, right abdominal pain, fever, and signs of inflammation and vomiting of obscure origin were suspicious symptoms. Barium meal radiographs did not necessarily show the perforation. Incorrect diagnosis invariably led to death. In unexplained retroperitoneal abscesses, retroperitoneal perforation of duodenal ulcer should be suspected.

2251 HISTOLOGY OF GASTRIC ULCER WITH REFERENCE TO CRITERIA OF ULCER CANCER. (E.) Kubo, T. (Kyushu U. Cancer Res. Inst., Fukuoka, Japan). *Gann* 62(1):1-11, 1971.

In a study of 373 surgically resected stomach ulcers, most of the ulcers which showed a complete breach of muscle coat were open, active ulcers, and not healed ulcers. On the other hand, fusion of muscularis mucosae and muscularis propria was especially marked in the healed and partially-healed ulcer groups. Fibrosis was minimally present in healed ulcer as opposed to open, active ulcers, suggesting that the reduction or involution of fibrous tissue occurs soon after the mucosa covers the denuded area. Thick layers of exudation and fibrinoid necrosis were recognized as characteristics of the active exacerbating large ulcer. Immature mucosal regeneration (single-layered epithelium and tufty gland anlage) was observed predominantly in open active ulcers, whereas mature regeneration (simple glands and normal appearing mucosa) occurred frequently in the healing and healed ulcers. Elements of histological criteria of ulcer cancer, such as breach of the muscularis, fusion, fibrosis, and regeneration are not stable or unchangeable findings. They can be produced and can disappear within a short period of time. With the use of these histological criteria, the age of a lesion cannot be indicated; however, they may help to determine whether an ulcer is inclined toward healing or toward ulceration. The true efficacy of these histological criteria of ulcers and cancer of the stomach should be questioned.

2252 OBSERVATIONS ON GASTRIC ACID OUTPUT BY A THREE-HOUR HISTAMINE INFUSION TEST USING MAXIMAL DOSES ON PATIENTS WITH DUODENAL ULCER AND IN NORMAL CONTROLS. (E.) Hector, R. M. (Cambridge Milit. Hosp., Aldershot, England) and J. F. Webb. *Gut* 11(12):994-997, 1970.

Histamine acid phosphate was infused i.v. at a rate of 40 μg/kg/hr in 100 male patients with duodenal ulcer and in 30 normal male controls over a 3-hr period. Gastric aspirate was collected from a nasogastric tube at various time intervals. Acid secretion continued to rise both quantitatively and qualitatively throughout each of the 3-hr periods in the ulcer patients, while acid secretion leveled off during the 2nd hr in the controls. Assay of 30-min aspirates in the duodenal ulcer group showed that the 90-120-min specimen (50.4 mEq; which was doubled) gave a close approximation to the actual value (50.9 mEq) of the 3rd hourly aspirate, and represents maximal acid secretion.

2253 GASTRIC ACID SECRETION IN SICKLE-CELL ANAEMIA. (E.) Wosornu, L. (Roy. Postgrad. Med. Sch., London) and F. I. D. Konotey-Ahulu. *Gut* 12(3):197-199, 1971.

Subjects consisted of 3 groups of patients including 25 males with proven sickle cell anemia, 40 males without anemia but with X-ray diagnosis of duodenal ulcer, and 30 other nonsicklemic persons with no history of ulcer dyspepsia. The augmented histamine test of Kay was performed in all subjects after an overnight fast; after collection of four 15-min basal secretions; patients received a single i.m. injection of 50 mg of pyrilamine maleate followed after 30 min by a s.c. injection of 0.04 mg/kg histamine acid phosphate. With respect to volume and acid output in the basal secretion hr and the hr after histamine administration, there was no significant difference for patients with sickle cell anemia and normal patients who had neither sickle cell anemia nor ulcer dyspepsia. The mean values for those with duodenal ulcers and no sickle cell anemia were significantly greater than those for both sickle cell and non-ulcer groups.

2254 HISTAMINE STIMULATION OF GASTRIC INTRINSIC FACTOR SECRETION. (E.) Rødbro, P. (Glostrup Hosp., Denmark). *Acta Med. Scand.* 188(5):451-455, 1970.

The effect of histamine (administered s.c. and i.v.) on gastric intrinsic factor secretion was studied in 13 subjects, most of whom had been hospitalized for peptic ulcer dyspepsia. Administration of histamine (40 μg/kg body weight s.c.) elicited a significant increase in intrinsic factor secretion rate within 15-min, which was followed by a gradual decrease. Continuous i.v. administration caused a significant increase after 1 hr. After s.c. histamine, the basal hr secretion rate and the secretion rate in the 1st hr after stimulation were both higher than the secretion rate in the 2nd hr after stimulation; but when given i.v., the 1st and 2nd stimulated hourly secretion rates were both higher than the basal secretion rate. There was no significant difference between histamine and tetragastrin administration. The secretion rate after histamine was correlated with the secretion rate after insulin. The hourly intrinsic factor output after 40 µg histamine diphosphate/kg body weight s.c. can seemingly be applied as a physiologically relevant parameter of the intrinsic factor secretory capacity.

2255 THE INTRINSIC FACTOR SECRETION IN LOCALIZED GASTRIC DISORDERS. (E.) Rødbro, P. (Glostrup Hosp., Denmark). *Acta Med. Scand.* 188(5):457-463, 1970.

Gastric secretion of intrinsic factor was measured in 228 patients with duodenal ulcer (65), gastric ulcer (50), gastric carcinoma (25), Addisonian pernicious anemia (35), and normal controls (53) by means of radioimmunoassay. The mean secretion rate in male duodenal ulcer patients was significantly higher than the secretion in male subjects who were normal or had gastric ulcer. The mean intrinsic factor secretion in female duodenal ulcer patients was significantly greater than the mean secretion in normal females. Males secreted significantly more intrinsic factor than females in the normal and in the duodenal ulcer groups, while no sex differences were found in the gastric ulcer groups. There was a significant correlation between age and stimulated intrinsic factor output in females with prepyloric ulcers. Maximal acid output was correlated with the stimulated intrinsic factor output in the control subjects, in the duodenal ulcer patients, and in the gastric ulcer patients. In subjects with a normal gastric mucosa the secretory capacity seems abundant in relation to the need for intrinsic factor.

2256 THE PARIETAL CELL MASS: GROWTH HORMONE RELATIONSHIP IN MAN. (E.) Hall, W. H. (VA Hosp., Little Rock, Ark.). *Am. J. Dig. Dis.* 16(2):139-143, 1971.

Maximal histamine response was compared in untreated patients with acromegaly and in patients with duodenal ulcer; patients with duodenal ulcer were examined for sensitivity of human growth hormone release to i.v. arginine and oral glucose. Three patients with acromegaly had a higher mean peak 30-min acid output in response to histamine than did the 14 patients with duodenal ulcer. Patients with duodenal ulcer failed to produce a higher peak level of growth hormone after arginine than did controls. Oral glucose did not cause an elevation in serum hormone levels of patients with duodenal ulcer. Although large parietal cell masses are a feature of acromegaly and growth hormone excess, duodenal ulcer disease with a large parietal cell mass did not exhibit abnormalities of human growth hormone control.

2257 PREVENTION OF DUODENAL ULCERS IN RATS BY FEEDING. (E.) Robert, A. (Upjohn Co., Kalamazoo, Mich.) and J. E. Dale. *Proc. Soc. Exp. Biol. Med.* 136(2):439-440, 1971.

Food, in the form of pellets, was offered to rats during constant infusion with ulcerogenic doses of histamine and carbachol to see whether formation of duodenal ulcers would be influenced. At the end of 48 hr, 36% of the fasted treated were dead, 92% had developed duodenal ulcers, and in 53% of the animals the duodenum was perforated. Several animals from this group died, all from pertonitis consequent to duodenal perforation. There were no deaths among the fed rats, no perforations, and only 14% developed duodenal ulcers (which were mild). Thus, feeding seems to prevent the formation of duodenal ulcers produced by constant infusion of histamine plus carbachol.

2258 STUDIES ON THE SYNERGISTIC ACTION AND ANTI-ULCEROUS ACTIVITY OF CORTISONE-GABOB. (E.) Nagai, K. (Nihon U. Inst. Physiol., Tokyo), A. Sano, K. Yamaguchi and Y. Kodaira. *Arzneim. Forsch.* 21(1):96-97, 1971.

In a group of male Wistar rats, discs of filter paper were embedded in the scapular region bilaterally, and the rats were injected i.m. every day with 1.77 mg/kg cortisone and 20 mg/kg of either 4-hydroxy-3-aminobutyric acid or 4-amino-3-hydroxybutyric acid. The resultant inhibition of granulation was greatest with cortisone plus the 4-amino-3-hydroxy compound (89.4%). In another group of animals, the cardia was ligated and rats were injected i.p. with 17.7 mg/kg cortisone and 200 mg/kg of the 4-amino-3-hydroxy compound 10 min before, and 1 hr after, ligation. Rats were sacrificed 18 hr after ligation. The anti-ulcer effect was least with cortisone alone, moderate with the butyric acid compound alone, and greatest with cortisone plus butyric acid. Microscopically, the tissue reaction increased in the same order with the various compounds tested.

2259 MORTALITY OF PERFORATED DUODENAL ULCER TREATED BY SIMPLE SUTURE. (E.) Booth, R. A. D. and J. A. Williams (Gen. Hosp., Birmingham, England). *Br. J. Surg.* 58(1):42-44, 1971.

Surgical mortality in 344 patients who underwent surgery for perforated duodenal ulcer was studied to compare the success of recently utilized ulcer curative surgery with that of simple suture. There were 10 deaths (2.9%) following operation for perforated duodenal ulcer; all of these patients had been treated by simple suture. The major causes of death were peritonitis, cardiopulmonary complications, and gastrointestinal bleeding. An overall policy of simple suture of perforated duodenal ulcer with conservative treatment in bad operative-risk patients (complicating cardiorespiratory disease) seems to make a mortality rate of less than 3% possible.

2260 GASTRIC EMPTYING AFTER VAGOTOMY AND PYLOROPLASTY. RELATION TO SOME POST-OPERATIVE SEQUELAE. (E.) Cobb, J. S., S. Bank (Groot Schuur Hosp. Observatory, Cape Town, South Africa), I. N. Marks and J. H. Louw. *Am. J. Dig. Dis.* 16(3):207-215, 1971.

A nasogastric tube was positioned with its tip in the most dependent part of the stomach and characteristics of stomach emptying were studied in 3 groups of patients including 9 controls (7 with constipation, 1 with Crohn's disease, and 1 with functional abdominal symptoms), 12 on alkali therapy for uncomplicated duodenal ulcers, and 19 who had undergone vagotomy and pyloroplasty at least 3 months previously for duodenal ulcers. Results were reproducible as seen when the study was repeated after an interval of a few days in 4 postoperative and 1 alkali-therapy patient. There was no significant difference between the alkali patients and controls with respect to starting index, half-life, and emptying time of the stomach. In postoperative patients, all 3 parameters were significantly decreased below levels seen in controls and alkali-therapy patients. In postoperative patients, the pattern of gastric emptying consisted of a very rapid initial emptying phase followed by an emptying rate that was still faster than that seen in the other 2 groups. Emptying was fastest in postoperative patients with postprandial fullness and dumping. In postoperative patients, the rate of emptying was increased immediately postoperatively, and increasing continuously until it reached a plateau after 2-3 months.

2261 VAGOTOMY AND DRAINAGE PROCEDURES FOR DUODENAL ULCER INCIDENCE AND EFFECT OF INCOMPLETE VAGAL SECTION. (E.) Judd, D. R. (St. Louis U. Dept. Surg., Mo.), G. B. Starkloff, W. Morioka, O. Quintero and W. T. Newton. *Arch. Surg.* 102(4):242-247, 1971.

The records of 171 patients treated for duodenal ulcer by vagotomy and drainage over an 8-yr period were analyzed, with particular emphasis on incomplete vagal section and recurrent ulcer. The operation and postoperative period were uncomplicated for 114 patients, while 57 had complications, most of which were nonspecific. Complications directly attributable to the choice of procedure included upper gastrointestinal bleeding (10 patients), spleen injury (7), and esophageal perforation (2). The overall mortality was 6.4%, and mortality in the patients who had been operated upon for massive, continuing hemorrhage was 22.2%. Only 1 death (0.9%) occurred after an elective operation. The mortality rate for patients less than 60 yr old was 1.8%; and for patients older than 60 yr, the mortality was 15%. The incidence of recurrent ulceration was 11.1% (19 patients). Insulin tests were performed in 60 of the 160 patients who survived surgery. Of these, 22 (37%) were positive, 30 (50%) were negative, and 8 (13%) were not interpretable. Sixty percent of the positive insulin tests were found in patients with recurrent ulcer. There were no recurrences in either the negative or noninterpretable groups. Routine postoperative insulin tests appear to be valuable as a prognostic guide.

2262 MUCOSAL VASCULATURE AFTER TRUNCAL VAGOTOMY. (E.) Halaris, A. E. (Max Planck Inst. Psychiat., Munich, Germany). *Experientia* 27(1):78-79, 1971.

The reaction of blood vessels in the gastric wall to truncal vagotomy in dogs was studied using electron microscopy. As early as 3 hr after vagotomy, the majority of capillaries showed marked constriction which persisted until the 14th day, and returned to normal by 4 weeks. In most capillary endothelial cells, the nuclei were swollen and the number of pinocytotic vesicles was reduced. At various places, the endoplasmic reticulum was dissociated or dilated, and the mitochondrial matrix was swollen. Truncal vagatomy seemingly causes a transitory ischemia with reduction in blood flow. These studies are important for analysis of surgery procedures using vagotomy for treatment of duodenal ulcer.

2263 TRANSABDOMINAL VAGECTOMY AND LOWER ESOPHAGEAL FUNCTION. (E.) Blackman, A. H., H. Rakatansky, M. Nasrullah and W. R. Thayer, Jr. (Rhode Island Hosp., Providence). *Arch. Surg.* 102(1):6-8, 1971.

Ten peptic ulcer patients undergoing transabdominal vagectomy were studied by means of esophageal manometry. The maximum end respiratory resting pressure and the length of the lower esophageal high pressure zone were not altered by vagectomy. Relaxation of the same zone following deglutition was neither impaired nor exaggerated by the operative procedure in 9 patients. While vagal nerve fibers may exert some effect on the lower esophageal high pressure zone, the complete control of this area is not mediated by nerve fibers sectioned after the usual surgically-produced transabdominal vagectomy in the treatment of peptic ulcer. The lack of postvagectomy dysphagia in these patients suggests that surgical or anatomic variability plays an important role in the occasional occurrence of postoperative dysphagia.

2264 PARIETAL CELL VAGOTOMY. STUDIES OF GASTRIC EMPTYING AND OBSERVATIONS OF PROTECTION FROM HISTAMINE-INDUCED ULCER. (E.) Interone, C. V., J. E. Del Finado, B. Miller, C. T. Bombeck and L. M. Nyhus (U. Illinois Coll. Med., Chicago). *Arch. Surg.* 102(1):43-44, 1971.

Selective parietal cell vagotomy in the dog was compared to other forms of gastric vagotomy, with and without drainage, with respect to gastric emptying time. Animals with total selective gastric vagotomy alone (without pyloroplasty) required a significantly longer time for stomach emptying than did controls. Hence, selective parietal cell vagotomy alone maintained normal emptying, while the other vagotomies required a drainage procedure. Also, the parietal cell vagotomy group required a significantly longer time to develop ulcers than any other group. No group of animals was immune to histamine-induced gastroduodenal ulcer, however. A dual mechanism could be involved in the observed increase of ulcer formation in Heidenhain pouch experiments. As selective parietal cell vagotomy decreases the parietal cell output of acid in the main stomach, the acid inhibition of gastrin release is also decreased. Significant parietal cell mass is diverted from continuity with the antral mucosa in the preparation of the Heidenhain pouch; this further decreases acid inhibition.

2265 GASTRIC DECOMPRESSION FOLLOWING VAGOTOMY AND DRAINAGE PROCEDURES. (E.) Kerry, R. L. (St. Joseph Mercy Hosp., Ann Arbor, Mich.), V. L. Hoshal and J. A. Ruiz. *Arch. Surg.* 102(4): 248-250, 1971.

All patients in this study underwent elective vagotomy and 1 of 3 drainage procedures (Heineke-Mikulicz pyloroplasty, Finney or Jaboulay gastroduodenostomy, or gastrojejunostomy). Nasogastric tubes were maintained in position in half the patients only during surgery, and in the other half for 5 days after surgery. Postoperatively, all patients were placed in the right lateral position for 1 hr of every 4 to facilitate drainage of the stomach. Oral feeding was begun in the 3rd postoperative day, or when the patient passed flatus. The frequency of complications and side effects for the tubeless and intubated groups, resp., was as follows: atelectasis, 16% and 23%; pneumonitis, 2% and 12%, wound dehiscence, 0% and 3%; nausea, 6% and 9%; vomiting, 2% and 3%; abdominal distention, 5% and 9%; and gastric dilatation, 0% and 3%. Of the 100 patients receiving tubeless decompression, nasogastric tubes were placed postoperatively in 7 because of questionable gastric dilatation. It is concluded that the use of nasogastric tube or gastrostomy after pyloroplasty and vagotomy should be reserved for cases of obvious gastric outlet obstruction, bleeding, and perforated ulcers.

2266 VAGOTOMY AND GALLBLADDER FUNCTION. (E.) Fagerberg, S. (U. Uppsala Dept. Radiol., Sweden), S. Grevsten, H. Johansson and U. Krause. *Gut* 11(9):789-793, 1970.

The effect of vagotomy on gallbladder function was investigated in a clinical and experimental study. In the clinical study using oral cholecystography in 13 patients, vagotomy was followed by a significant increase in the volume of the gallbladder; the effect of cholecystokinin on the gallbladder remained unchanged. After vagotomy in the rabbit, gallbladder pressure response to cholecystokinin at a small dose (1 unit/kg) was less than before vagotomy. At a larger dose, after vagotomy, cholecystokinin elicited a stronger response. Calcium, bilirubin, and cholesterol were increased and the pH decreased in gallbladder bile following vagotomy. Vagal denervation apparently induces hypotonicity of the gallbladder. The biochemical alterations may indicate a stasis of the gallbladder contents. Alternatively, division of the right vagus may modify the ciliary constituents by a direct action on the hepatic cells.

2267 RECONSTRUCTION AFTER TOTAL GASTRECTOMY WITH FIGURE 6 LOOP SMALL INTESTINE. (E.) Kondo, T. (Nagoya U. Sch. Med., Japan), H. Ichihashi, T. Kanemitsu and M. Hisazaki. *Ann. Surg.* 173(4):529-533, 1971.

Various methods of anastomosis have been attempted to improve nutrition and eliminate the unpleasant sequelae of total gastrectomy. After end-to-end anastomosis of the esophagus and the duodenum or after Roux-en-Y esophagojejunostomy, reflux esophagitis has often occurred for both; dumping syndrome and nutritional disturbances occurred primarily in the former. However, the interposition of upper jejunum in the form of the figure 6 between the esophagus and duodenum provided for circulation of food in the loop for a period of time. Progress of patients undergoing this procedure was satisfactory, and no reflux esophagitis or dumping occurred. Only 2 patients with diabetes mellitus showed slight dumping syndrome during glucose tolerance tests.

2268 METABOLIC BONE DISEASE AFTER GASTRECTOMY. (E.) Eddy, R. L. (Scott and White Clin., Temple, Tex.). *Am. J. Med.* 50(4):442-449, 1971.

The significance of postgastrectomy bone disease was determined in a study of 342 postgastrectomy patients (285 men and 57 women) and a control group of 180 patients with peptic ulcer (159 men and 21 women); both groups were without apparent hepatic or renal dysfunction. Of the postgastrectomy patients, 212 (62%) had Billroth II procedures, 104 (30.4%) had vagotomy and pyloroplasty, and 26 (7.6%) had Billroth I procedures; the postoprrative period ranged from 2 to 20 yr. Histories for the presence or absence of bone pain and/or tenderness were elicited, followed by determinations of serum calcium, phosphorus, and alkaline phosphatase, and a limited bone survey. A total of 26.3% of postgastrectomy patients and 4.4% of the nonsurgical group had bone pain and/or tenderness. There were significant differences between the 2 groups with respect to serum calcium, phosphorus, and alkaline phosphatase. With the exception of a higher incidence of elevated alkaline phosphatase in the Billroth II procedure as compared to the other 2 operative procedures, no correlation was found between the type of surgical procedure and the frequency of bone symptoms, the incidence of hypocalcemia, or the incidence of hypophosphatemia. A total of 30% of the postgastrectomy patients had defects in calcium metabolism (osteomalacia was the major bone lesion), while only 5% of the control group had similar defects. Correlations with fecal fat excretion studies suggested malabsorption to be the predominant causative mechanism.

2269 PATHOLOGY OF ACUTE GASTRODUODENAL ULCERS. (Fr.) Dupont, A. (CHU Serv. Pathol. Anat., Lille, France) and B. Gosselin. *Lille Med.* 15(8):1113-1117, 1970.

2270 ACID AND PEPSIN SECRETION INDUCED BY GASTRIN AND PENTAGASTRIN IN MAN. (Fr.) Limbosch, J. M. (St. Pierre U. Hosp., Brussels, Belgium), M. C. Woussen-Colle, A. Gerard and J. De Graef. *Acta Gastroenterol. Belg.* 33(12): 881-892, 1970.

2271 FREE HYDROCHLORIC ACID AND PEPSIN OUTPUT IN STUDIES OF GASTRIC SECRETION. (Rus.) Vakaliuk, P. M. and N. N. Serediuk. *Ter. Arkh.* 42(7):47-48, 1970.

2272 ACID OUTPUT IN CONTROL SUBJECTS AND PATIENTS WITH DUODENAL ULCER USING FIXED DOSES OF HISTAMINE. (E.) Desai, H. G. (B.Y.L. Nair Charitable Hosp., Bombay, India), M. P. Zaveri, D. J. Mohalla and F. P. Antia. *Indian J. Med. Res.* 58(1):33-38, 1970.

2273 METABOLIC EFFECT OF HYDROCORTISONE ON ENZYMES OF THE GASTRIC MUCOSA IN PEPTIC ULCER. (Fr.) Prodescu, V. (Brincovenesc Hosp., Bucharest, Rumania), C. Stoicescu and R. Ioanidis. *Arch. Un. Med. Balkan. (Bucur.)* 8(3):309-313, 1970.

2274 EXPERIMENTAL THERAPEUTIC APPROACHES TO PEPTIC ULCER. (Rev.) (E.) Gillespie, I. E. (Western Infirm., Glasgow, Scotland). *Br. J. Surg.* 57(10):791-794, 1970.

2275 RADIOLOGICAL STUDIES OF THE STOMACH AND DUODENUM AFTER SOME NEW SURGICAL PROCEDURES IN THE TREATMENT OF ULCER. (Pol.) Dolzycki, E. (Med. Acad. 3rd Dept. Gen. Surg., Cracow, Poland), T. Popiela, B. Oplawski and L. Bobak. *Przegl. Lek.* 27, Pt. 2(11):813-820, 1970.

2276 POSTGASTRECTOMY AND POSTVAGOTOMY SYNDROME AFTER SURGERY FOR GASTRODUODENAL ULCERS. (Rum.) Mandache, F. (Brincovenesc Hosp., Bucharest, Rumania), V. Prodescu and S. Constantinescu. *Chirurgia (Bucur.)* 19(9):775-786, 1970.

2277 RETROSPECTIVE ANALYSIS OF THE SUTURING OF PERFORATED PEPTIC ULCERS. (Ger.) Berndt, V. (U. Dusseldorf Surg. Clin., Germany), R. M. Konrad, B. Biermann and B. Grabensee. *Chirurg* 41(12):549-553, 1970.

2278 POSTOPERATIVE "ACUTE ULCERS" IN GENERAL SURGERY. (Fr.) Lagache, G., C. Proye and J. Chevert. *Lille Med.* 15(8):1132-1139, 1970.

2279 "ACUTE ULCERS" IN NEUROSURGERY. (Fr.) Laine, E. (Neurosurg. Clin., Lille, France), P. Fossati and J. L. Christiaens. *Lille Med.* 15(8):1152-1157, 1970.

2280 ANASTOMOTIC ULCER. (Por.) Specterow, J., J. M. Pitella, M. C. S. Tannouz and A. Caparica, Jr. *Rev. Bras. Cirurg.* 59(1-2): 20-21, 1970.

2281 PERFORATED DUODENAL PEPTIC ULCER WITH HEMOPERITONEUM IN THE PREMATURE NEWBORN. (It.) Gavinelli, R. (St. Anna Provincial Hosp., Turin, Italy) and V. Aimone. *Minerva Pediatr.* 22(28):1397-1399, 1970.

2282 THE EFFECT OF AMBIENT TEMPERATURE ON RESTRAINT ULCER IN THE RAT. (E.) Martin, M. S. (Edouard Herriot Hosp., Lyon, France), F. Martin and R. Lambert. *Digestion* 3(6):331-337, 1970.

2283 EFFECTS OF AUDIOVISUAL STIMULATION ON THE INCIDENCE OF RESTRAINT ULCERS IN WISTAR RATS. (Fr.) Martin, M. S. (INSERM Dept. Physiopathol., Lyon, France), F. Martin and R. Lambert. *C. R. Soc. Biol. (Paris)* 164(8-9): 1748-1750, 1970.

See also numbers: 2095, 2096, 2097, 2117, 2118, 2120, 2272, 2320, 2321, 2697

2284 HEALING OF INVERTED AND EVERTED INTESTINAL ANASTOMOSES IN GERMFREE RATS. (E.) Yale, C. E. (U. Wisconsin Med. Sch., Madison) and J. V. Van Gemert. *Surgery* 69(3): 382-388, 1971.

Conventional and germfree Sprague-Dawley rats were sacrificed with pentobarbital sodium, and the following intestinal segments were removed: two 4-cm segments of proximal jejunum and of distal ileum, and one 3-cm segment of proximal and of distal large intestine. In conventional rats, there was no difference between proximal and distal small intestine with respect to bursting pressure, volume of test segment at rupture, or circular wall tension. Although the proximal small intestine of the germfree rats had the same values as conventional rats, there was a significantly lower bursting pressure and higher rupture volume in germfree distal small intestine compared to those of the conventional distal small intestine. The bursting pressure of the proximal colon was significantly greater than that of the distal colon in the conventional and germfree rats, and was nearly equal to that of the proximal small intestine. Rupture volumes of proximal large intestine were nearly equal to those of distal large intestine in both types of rats, but were significantly greater than the rupture volumes of their respective small intestines; those of the germfree rat colon were twice those of the conventional rat colon. The wall tension of the proximal colon was slightly greater than that of the distal colon in both rat types, and large intestine values were significantly greater than small intestine values. The value for wall tension in the germfree large intestine was significantly greater than in the conventional large intestine. When germfree rats were prepared with inverted or everted intestinal anastomoses at all 4 sites, the inverted anastomoses were significantly stronger than the everted ones during the first 6 days, while both were stronger than adjacent intestinal portions for the first 14 days. In everted anastomoses, there was a greater incidence of perianastomotic adhesions and a greater inflammatory cell response in the suture line.

2285 RIGHT PARADUODENAL INTERNAL HERNIA. (E.) Bartlett, J. D., Jr. (U. Michigan Dept. Surg., Ann Arbor), W. Martel and S. M. Lindenauer. *Surg. Gynecol. Obstet.* 132(3):443-449, 1971.

Four patients with right paraduodenal internal hernia, which can cause partial or complete intestinal obstruction at any age and may be life threatening, are discussed. The diagnosis of internal hernia should be considered in patients with symptoms of intestinal obstruction, particularly when they are intermittent. Radiology is essential in establishing the preoperative diagnosis and may show gas-filled, distended segments of the proximal portion of the small intestine, restricted to the right of the spine. The abnormal position of the small intestine and right colon suggests the possibility of paraduodenal internal hernia. Prompt surgical correction, consisting of reduction of the hernia and obliteration of the sac, should be undertaken once the diagnosis of this congenital lesion has been established, even if the patient is asymptomatic.

2286 LATE SEQUELAE OF BLIND INTESTINAL POUCHES. (E.) Whitaker, W. G., Jr. (Atlanta, Ga.) and D. Shepard. *Am. J. Surg.* 120(6):752-755, 1970.

The most frequent complications in patients with blind intestinal loops or pouches are recurrent intestinal obstruction, anemia, fatigue, melena, diarrhea, or weakness. These are thought to be secondary to stasis, stagnation, and infection within the loop or pouch. Frequently there is ulceration which may be complicated by perforation and/or bleeding. The macrocytic or microcytic anemia that may be seen is probably due to stagnation, with abnormal bacterial growth in the loop. Mechanical disturbances and obstruction are usually due to the bulk and weight of a distended pouch. Acute onset and remission of symptoms may be due to abrupt changes in emptying and filling of the pouch with the positional changes of the patient. Radiographic studies are seldom diagnostically definitive, and surgical exploration is usually necessary.

2287 URINARY VOLATILE PHENOLS IN PATIENTS WITH INTESTINAL OBSTRUCTION. (E.) Tamm, A. (Tartu State U. Dept. Propedeut. Intern. Med., USSR) and K. Villako. *Scand. J. Gastroenterol.* 6(1):5-7, 1971.

The diurnal excertion of volatile phenols was determined in 16 patients with intestinal obstruction, and in 23 controls, to elucidate the origin of these compounds in the gastrointestinal tract. The normal excretion of volatile phenols ranged from 19-88 mg of p-cresol equivalents/day. Small intestinal obstruction for more than 12 hr was followed by a significant increase in phenol excretion (17-350 mg). Normal excretory values of volatile phenols were observed in patients with large intestinal obstruction. Oral antibiotics and/or restoration of normal intestinal motility reduced phenol excretion. The rise of urinary volatile phenols may be due to small intestinal bacteria.

2288 EXPERIMENTAL SPHINCTER FOR SHORT-BOWEL SYNDROME. (E.) Grier, R. L., A. W. Nelson (Colorado State U. Surg. Lab., Fort Collins) and W. V. Lumb. *Arch. Surg.* 102(3): 203-208, 1971.

ll 15 adult beagles were subjected to an 80% esection of the distal small intestine. In ddition, 9 of the experimental animals were repared with an intraluminal sphincter by nvagination of an everted portion of the distal ejunal segment into the proximal jejunal segment. radual weight loss was seen in all dogs; but by 8 days, the controls showed a significantly reater loss (22.8%) than the experimental dogs ith sphincters (18.0%); the difference was even reater after 56 days (26.6% and 18.0%, resp.). fter 28 days, mean gastric emptying times were 6 and 36 min in controls and experimental dogs, esp.; by 56 days, both were prolonged to the ame extent. With barium studies, the sphincter as identifiable radiologically in 7 of the 9 ogs; and in 4 dogs, the sphincter seemed to ave effectively retarded intestinal transit. ineradiography showed that barium gradually ccumulated proximal to the sphincter, causing he jejunum to dilate. Intestinal contractions ere noted proximal to the sphincter which produced back-and-forth mixing of the barium-impregnated hyme. Experimental dogs showed both greater ecal fat excretion (measured in per cent and g at/100 g feces) than controls; there was no ifference in fecal nitrogen or water levels etween the 2 groups. Gradual, but progressive, nemia developed in both groups, but to a lesser xtent in controls. At necropsy, there was no vidence of anastomotic leakage or constrictive dhesions. Gastric ulcers occurred in 2 of the xperimental dogs. Microscopically most dogs ad extensive clumps of bacteria and debris on he surface of the intestinal mucosa, between he villi, and in the crypts.

289 IDIOPATHIC ULCER OF SMALL BOWEL WITH PSEUDOLYMPHOMATOUS REACTION. A LINICOPATHOLOGICAL STUDY OF SIX CASES. (E.) rtinian, B., J. O. Lough (Montreal Gen. Hosp., uebec, Canada) and J. D. Palmer. *Arch. Pathol.* 1(4):327-333, 1971.

he morphological features and the pathogenesis n 6 cases of pseudolymphoma of the small bowel re described. All 6 patients presented with an lcerated tumor which could not be differentiated rom lymphoma or carcinoma either clinically or adiologically. The characteristic morphological eatures common to each of the cases were ulceraion of the small intestine, zonal reaction round the ulcer, and absence of tumor in regional ymph nodes. There was a well-defined zone henomenon beginning with central necrosis in he ulcer base, subjacent to this was a hyperemic and of intense polymorphous inflammatory reaction, which was surrounded by an outer layer f fibrotic tissue. Hodgkin's disease was the initial diagnosis in 3 cases, reticulum cell arcoma in 2, and anaplastic carcinoma in one. hese pseudolymphomas seem to be an overreaction y the lymphoreticular system to ulceration of he small intestine.

2290 IN-VIVO INTESTINAL MUCOSAL UPTAKE OF IRON, BODY IRON ABSORPTION AND GASTRIC JUICE IRON-BINDING IN IDIOPATHIC HAEMOCHROMATOSIS. (E.) Powell, L. W. (U. Queensland Roy. Brisbane Hosp., Australia) and E. Wilson. *Australas. Ann. Med.* 19(3):226-231, 1970.

Gastric juice iron binding capacity did not differ significantly in patients with idiopathic hemochromatosis compared to controls, and venesection therapy only slightly reduced values. In vivo intestinal mucosal uptake and body iron absorption were significantly higher in hemochromatosis patients, except for the 4 untreated patients, in whom mucosal uptake was normal. Neutralized gastric juice from patients with idiopathic hemochromatosis did not significantly affect intestinal mucosal uptake or body iron absorption in subjects with histamine-fast achlorhydria. Apparently the inappropriate iron absorption in patients with idiopathic hemochromatosis results not from a defect in gastric secretion, but probably a mucosal abnormality.

2291 AN ELECTRON MICROSCOPIC STUDY OF THE SMALL INTESTINE IN HUMAN CHOLERA. (E.) Chen, H.-C. (Natl. Taiwan U. Coll. Med., Taipei), V. Reyes and J. W. Fresh. *Virchows Arch.* [*Zellpathol.*] 7(2/3):236-259, 1971.

Electron microscopic study of biopsies of the small intestine obtained with the Crosby capsule from 8 patients with proven cholera was performed. Severe interstitial edema in the lamina propria due to an increased vascular permeability with rarefaction of the endothelial cells and irregular widening of the epithelial intercellular spaces basal to the apical junctional complex was noted. Extracellular water was absorbed by diffusion through the lateral plasma membrane to the smooth endoplasmic reticulum, which showed hypertrophy initially and became vesicular and vacouler with an excessive water insorption (intracellular transport of water). Characteristic vacoular epithelial cells appeared, often with spotty or patchy alteration in the brush borders. The deformed microvilli showed a secretory activity as a mechanism of release of the intracytoplasmic water (transcellular passage of water).

2292 PRIMARY MULTIPLE CARCINOMA OF THE SMALL INTESTINE WITH CEREBRAL METASTASES AND SIMULTANEOUS PRIMARY CARCINOMA OF THE STOMACH. (Dan.) Linde, N. C. (Bys Hosp., Vejle, Denmark). *Ugeskr. Laeger* 132(41):1913-1915, 1970.

2293 ANEMIA AND PRIMARY CANCER OF THE SMALL INTESTINE. (Rus.) Falileev, I. V. and I. A. Finogenova. *Khirurgiia (Mosk.)* (10):119-122, 1970.

2294 SMALL INTESTINE NEOPLASMS. (Rus.) Savchuk, B. D., S. I. Losev and M. N. Chuprikova. *Khirurgiia (Mosk.)* (10):54-60, 1970.

2295 PRIMARY RETICULOSARCOMA OF THE SMALL INTESTINE. (Rus.) Kuzin, M. I., V. S. Pomelev, O. P. Kurguzov and N. M. Isaev. *Sov. Med.* 33(8):67-73, 1970.

2296 PRIMARY MALIGNANT MELANOMA OF THE SMALL INTESTINE. (Bul.) Milenkov, H., D. Hadzlev and A. Angelov. *Onkologiia (Sofiia)* 7(2):93-96, 1970.

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2300 DUODENUM TUMOR IN A PATIENT WITH VON RECKLINGHAUSEN'S DISEASE. (Dut.) Van Vroonhoven, T. J. M. V. (Dijkzigt Acad. Hosp., Rotterdam, Netherlands). *Ned. Tijdschr. Geneeskd.* 114(31):1291-1294, 1970.

2301 AN 11-YEAR REVIEW OF PRIMARY TUMOURS OF THE SMALL BOWEL INCLUDING THE DUODENUM. (Rev.) (E.) Hancock, R. J. (U. British Columbia Dept. Surg., Vancouver, Canada). *Can. Med. Assoc. J.* 103(11):1177-1179, 1970.

2302 ADENOMA OF BRUNNER'S GLANDS. (Por.) Paulino, F. (Fed. U. Sch. Med., Rio de Janeiro, Brazil), A. Roselli and U. Martins. *Rev. Assoc. Med. Bras.* 16(7):243-244, 1970.

2303 SURGERY FOR MALIGNANT OBSTRUCTIVE JAUNDICE. (Rev.) (Ger.) Kern, E. (Univ. Surg. Clin., Wurzburg, Germany) and B. Friedrich. *Chirurg* 41(12):545-549, 1970.

2304 LEIOMYOMA OF THE JEJUNUM. (E.) Wood, M. J., H. I. May, J. F. Johnson and E. K. Lang. *J. La. State Med. Soc.* 122(11): 346-347, 1970.

2305 AN UNUSUAL REDUPLICATION OF THE ILEUM. (E.) Aubrey, D. A. (Edward J. Meyer Mem. Hosp., Buffalo, N. Y.). *Am. J. Surg.* 120(6): 815-816, 1970.

2306 DUODENUM DUPLICATION. TWO CASES REVEALED BY ACUTE DUODENAL STENOSIS IN ADULTS. (Fr.) Adloff, M. (Surg. Clin. A, Strasbourg, France) and M. Lampert. *Chirurgie* 96(13):897-904, 1970.

2307 STENOSIS OF THE DESCENDING PART OF DUODENUM DUE TO AN ANNULAR PANCREAS. (Ger.) Hamann, P. (Dist. Hosp., Brandenburg, Germany). *Med. Bild.* 13(5):143-144, 1970.

2308 DIAGNOSIS OF SMALL INTESTINE OCCLUSION IN ADULTS. (Rev.) (Fr.) Warlin, J. F. *Infirm. Fr.* (113):7-12, 1970.

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2310 PNEUMOPERITONEUM ASSOCIATED WITH JEJUNAL DIVERTICULOSIS. (E.) Armitage, H. V. (Sacred Heart Hosp., Chester, Pa.). *Pa. Med.* 73(10):61-62, 1970.

2311 INTERMITTENT ILEUS DUE TO GENERALIZED SMALL INTESTINE DIVERTICULOSIS. (Ger.) Lampe, K. (City Hosp., Osnabruck, Germany), R. D. Schopen and M. Hudepohl. *Fortschr. Roentgenstr. Nuklearmed.* 113(5):682-683, 1970.

2312 PERFORATION OF DUODENAL DIVERTICULUM WITH CIRRHOSIS OF THE LIVER: AN AUTOPSY CASE OF PERFORATION. (Jap.) Kuga, M. (Tokyo Women's Med. Coll.), M. Takikawa and C. Koyama. *Tokyo Joshi Ikadaigaku Zasshi (J. Tokyo Wom. Med. Coll.)* 40(10):697-702, 1970.

2313 ENTERIC PERFORATION. A STUDY OF 60 CASES. (E.) Sepaha, G. C. (M.G.M. Med. Coll., Indore, India), J. D. Khandekar and M. L. Chabra. *J. Indian Med. Assoc.* 54(12): 558-561, 1970.

2314 SURGICAL MANAGEMENT OF TYPHOID PERFORATION OF THE ILEUM. (E.) Dawson, J. H. (U. Washington Sch. Med., Seattle). *Am. Surg.* 36(10):620-622, 1970.

2315 CORRELATION BETWEEN THE ABSORBITIVE CAPACITY OF THE SMALL INTESTINE AND

THE MORPHOLOGICAL CHANGES IN ITS MUCOSA IN CHRONIC ENTEROCOLITIS. (Rus.) Menshikov, F. K. and V. P. Kostenko. *Ter. Arkh.* 42(12):52-57, 1970.

2316 PNEUMATOSIS CYSTOIDES INTESTINALIS. (Sp.) Garcia De La Fuente, A. (Provincial Hosp., Madrid, Spain) and J. L. Barros. *Hosp. Gen. (Madr.)* 10(5):507-530, 1970.

2317 ISCHEMIC DISEASES OF THE BOWEL. IV. ROENTGENOGRAPHIC FINDINGS. (E.) Wittenberg, J. (Boston City Hosp., Mass.). *Dis. Colon Rectum* 13(4):294-296, 1970.

2318 CONTROVERSIAL RADIOLOGICAL AND CLINICAL SYNDROME: DUODENAL COMPRESSION BY THE MESENTERIC ARTERY. (Rum.) Dan Ionescu, P. *Med. Interna (Bucur.)* 22(8):1001-1009, 1970.

See also numbers: 2051, 2098, 2104, 2121, 2122, 2123, 2124, 2127, 2218, 2312, 2604, 2616, 2680

REGIONAL ENTERITIS

2319 HISTOLOGICAL DIAGNOSIS BY PERORAL BIOPSY OF CROHN'S DISEASE OF THE PROXIMAL INTESTINE. (E.) Hermos, J. E., H. L. Cooper, P. Kramer and J. S. Trier (Boston U. Sch. Med., Mass.). *Gastroenterology* 59(6):868-873, 1971.

Two patients with Crohn's disease involving the proximal small intestine are presented. In both cases, peroral duodenal biopsies showed the characteristic histologic features of the disease including noncaseating granulomas. In both patients, only 1 of the 2 biopsy specimens showed the sarcoid-like granulomatous lesions, whereas the companion biopsies were histologically normal, indicating the patchy nature of the mucosal involvement in Crohn's disease of the proximal intestine. Thus, while biopsy containing a granulomatous lesion may confirm the presence of Crohn's disease, a normal biopsy does not exclude it. Peroral biopsies of the involved intestine should be obtained when Crohn's disease is suspected in an effort to provide histological confirmation of the clinical diagnosis.

2320 PEPTIC ULCERATION IN CROHN'S DISEASE (REGIONAL ENTERITIS). (E.) Fielding, J. F. (Gen. Hosp., Birmingham, England) and W. T. Cooke. *Gut* 11(12):998-1000, 1970.

In 300 patients (143 men and 157 women) with Crohn's disease (51 with Crohn's colitis) followed for a mean of 11.7 yr, the frequency of peptic ulceration was 8%. Gastric secretory studies were performed in 22 patients (12 men and 10 women) with no ulcer history and without corticosteroid treatments within the past 12 months. Eight men and 3 women had had more than 60 cm of small intestine resected. There was no significant difference between the acid production in the 8 men with large resections and 20 patients without regional enteritis, but with proven peptic ulcer disease. None of the patients with Crohn's colitis had peptic ulceration. Only 5 (4%) of the 124 patients who received steroid therapy developed peptic ulceration. Resection of the distal small bowel may be a factor in the increase of peptic ulceration in Crohn's disease.

2321 CROHN'S DISEASE OF THE STOMACH AND DUODENUM. (E.) Fielding, J. F. (Gen. Hosp., Birmingham, England), D. K. M. Toye, D. C. Beton and W. T. Cooke. *Gut* 11(12):1001-1006, 1970.

The significance of involvement of the stomach and duodenum in Crohn's disease was considered from the experience of 12 patients followed between 1944 and 1969. Granulomatous lesions were demonstrated histologically in 4 patients; macroscopic appearances at operation were considered characteristic in 9 patients; and, in 11, radiological appearance indicated this diagnosis. Nausea and vomiting occurred in 9 patients. Of the 12 patients, 2 have died from unrelated causes and 10 remain well. Bypass operations were successfully performed in 6 patients who had pain and obstructive symptoms. Three patients were treated with ACTH due to involvement of other areas of the small intestine. Three patients received no definitive therapy.

2322 GRANULOMAS IN SUCTION BIOPSIES OF DISTAL DUODENUM. AN AID IN THE DIAGNOSIS OF "GRANULOMATOUS ENTERITIS. (E.) Harrer, W. V. (Jefferson Med. Coll., Philadelphia, Pa.), F. Goldstein and C. W. Wirts. *Gastroenterology* 59(6):862-867, 1971.

Two cases of "granulomatous enteritis" diagnosed by suction biopsy of the distal duodenum are presented. X-ray examination of the small bowel of the 1st patient revealed a diffusely abnormal pattern with flocculation of barium, and probable edema of the mucosal folds. Peroral suction biopsy of the distal duodenum disclosed the presence of multinucleated giant cells and typical granuloma formation in the submucosa. Treatment with a gluten-free diet, antibiotics, and salicylazosulfapyridine was ineffective, but the patient responded to intermittent courses of prednisolone in doses not exceeding 30 mg/day. In the 2nd case, a barium contrast study revealed diffusely abnormal distal duodenum, jejunum and ileum with prominent, though distinguishable, mucosal folds and suspected mucosal edema. Biopsy of the distal duodenum revealed "granulomatous enteritis" with multinucleated giant cells in the submucosa with typical granuloma formation. Prednisone treatment was effective.

2323 ETIOLOGY OF CROHN'S DISEASE. (E.) Fielding, J. F. (Radcliffe Infirm., Oxford, England). *Lancet* 2(7669):424, 1970.

2324 REGIONAL ENTERITIS AND ITS RELATION TO EMOTIONAL DISORDERS. (E.) Cohn, E. M. (U. Pennsylvania Div. Grad. Med., Philadelphia), I. I. Lederman and E. Shore. *Am. J. Gastroenterol.* 54(4):378-387, 1970.

2325 THE RADIOLOGY CORNER. ADENOCARCINOMA OF THE ILEUM COMPLICATING REGIONAL ENTERITIS. (E.) Ben-Asher, H. (230 South St., Morristown, N. J.). *Am. J. Gastroenterol.* 55(4): 391-398, 1971.

See also numbers: 2099, 2396

MALABSORPTION

2326 LACTOSE MALABSORPTION IN THAI INFANTS. (E.) Varavithya, W. (Ramathibodi Hosp., Bangkok, Thailand), A. Valyasevi and S. Charuchinda. *J. Pediatr.* 78(4):710-715, 1971.

Abnormal lactose tolerance was seen in 60% of infants with malnutrition and in 69% of infants with diarrhea, whereas only 22% of "normal" Thai children showed this abnormality. Of the malnourished infants, 80% who had abnormal lactose tolerance developed diarrhea following the test. Follow-up studies in 4 malnourished infants with diarrhea revealed abnormal lactose tolerance for 13 weeks in 2 infants and beyond 20 weeks in 2 others. In spite of the abnormal tolerance and persistant loose stools, 3 of 4 infants gained weight fairly well on a proprietary milk formula and regular diet. The fact that a significantly higher proportion of malnourished infants under the age of 2 yr were lactase deficient, and that an even greater proportion of infants with diarrhea in addition to malnutrition were deficient, strongly suggests that the deficiency is acquired and associated with protein caloric malnutrition and diarrhea. A nonlactose milk formula or other lactose-free foods, at least during the recovery phase, would probably be the diet of choice in infants who present with recurrent diarrhea and malnutrition.

2327 LACTOSE TOLERANCE IN AN ARAB POPULATION. (E.) Gilat, T. (Ichilov Hosp., Tel Aviv, Israel), E. G. Malachi and S. B. Shochet. *Am. J. Dig. Dis.* 16(3):203-206, 1971.

Lactose tolerance tests were performed on 67 adult Arabs following an overnight fast. Of the 67 subjects, 54 (80.6%) had a low rise in glucose, and most of these (38 of 54) had symptoms during the test. Symptoms included diarrhea and/or abdominal pains, borborygmus, abdominal distention with much gas. A low rise in glucose was found more frequently in females (87.5%) than in males (70.4%), and more frequently in subjects above age 40 (85.2%) than in those below 40 (77.5%); these differences were not statistically significant. The rise in glucose correlated with jejunal lactase in 26 of 28 cases (92.8%), while symptoms correlated with the enzyme assay in 22 of 28 cases (78.5%). All subjects studied had a low milk intake that did not correlate with lactose tolerance. All Mediterranean groups that have been studied (Greek Cypriots, Jews, and Arabs) seem to exhibit a high incidence of adult lactose intolerance.

2328 MALABSORPTION AND GROWTH FAILURE DUE TO INTESTINAL ENTEROKINASE DEFICIENCY. (E.) Haworth, J. C. (Child. Hosp. Winnipeg, Manitoba, Canada), B. Gourley, B. Hadorn and C. Sumida. *J. Pediatr.* 78(3):481-490, 1971.

A young male with malnutrition and growth failure in whom pancreatic secretion was normal, but (because of intestinal enterokinase deficiency) the proteolytic proenzymes were not activated and effective proteolytic enzyme activity was absent, is presented. The patient was thought to have milk allergy at age 11 months, and was placed on a milk-free diet. He did poorly and at age 6 was thought to have celiac disease, and was treated with a gluten-free and milk-free diet. With no improvement by age 8, duodenal intubation was performed and showed no trypsin or chymotrypsin activity. Subsequently, on a normal diet and 1 tablet of pancreatic extract before each meal, the patient had a much greater rate of growth and, by age 11, was well proportioned. A secretin-pancreozymin test for pancreatic function was then performed; the duodenal juice contained very low proteolytic activity, but other constituents were normal. The in vitro addition of crystalline enterokinase, a homogenate of duodenal mucosa from another patient, or small amounts of trypsin resulted in normal levels of rypsin and chymotrypsin.

2329 INTESTINAL DISACCHARIDASE ACTIVITY IN PSORIATIC ENTEROPATHY. (E.) Roberts, . M. (British Milit. Hosp., Munster/Westphalia, ermany) and F. E. Preston. *Scand. J. Gastroenterol.* (1):93-96, 1971.

ejunal mucosal biopsy, with examination of ntestinal morphology and disaccharidase activity, as performed in 14 patients with psoriasis. atients also underwent the lactose and glucose/ alactose tolerance tests, the xylose absorption est, and the lactose-barium meal. Decrease of 1 r more of the disaccharidase activities (lactase, ucrase, or maltase) was seen in 8 patients, most f whom had decreased activity of more than 1 nzyme. The lactose tolerance test was abnormal n 6; and glucose/galactose test in 2, the xylose bsorption test in 3, while the lactose-barium eal was positive in 5 patients (4 of whom had bnormal disaccharidase activities and tolerance nd absorption tests). Partial villous atrophy as seen in about a third of the patients, but he mucosa was never flat; most of these patients howed abnormalities of the other parameters.

330 DERMATITIS HERPETIFORMIS ENTEROPATHY AND WHIPPLE'S DISEASE. (E.) Myhre, E. Univ. Hosp., Oslo, Norway), S. Skrede and E. jone. *Acta Med. Scand.* 188(4):301-302, 1970.

57-yr-old male farmer was diagnosed as having hipple's disease with a typical clinical picture f steatorrhea, lymphadenopathy, skin pigmentation, nd arthropathy. Periodic acid Schiff-positive acrophages were demonstrated in the lamina ropria of the small intestine, in lymph nodes, nd in the skin. The patient responded well to etracycline treatment, with relapse on its ithdrawal. Also present in this patient was arked villous atrophy of the intestinal mucosa hich did not respond to a gluten-free diet and nly to restricted dietary fat. Many years later, he patient developed a typical dermatitis erpetiformis which disappeared following treatent with diphenyl sulfone. The intestinal illous atrophy demonstrated 4 yr before the skin anifestations possibly means that dermatitis erpetiformis may start with enteropathy. This atient apparently demonstrates an association etween dermatitis herpetiformis enteropathy previously shown to be related to malignancy and celiac disease) and Whipple's disease, with effects in the lymphatic system.

2331 THE FINE STRUCTURE OF THE JEJUNUM IN KWASHIORKOR. (E.) Theron, J. J. (Natl. Inst, Nutr. Dis., Pretoria, South Africa), W. Wittmann and J. G. Prinsloo. *Exp. Molec. Pathol.* 14(2):184-199, 1971.

During the acute stages of kwashiorkor, jejunal specimens showed varying degrees of atrophy and broadening of the intestinal villi under the light microscope. The most striking and constant finding in 9 of 16 patients was the presence of numerous lipid droplets within the absorptive cells of the villous tips and along the sides of the villi; larger numbers of droplets were found at the tips of the villi. With the electron microscope, patients who showed no marked lipid infiltrations under the light microscope had fat in the absorptive cells in the form of small particles enclosed by membranes of the smooth endoplasmic reticulum. Fat particles were regularly encountered in dilated Golgi vesicles and as chylomicrons in enlarged intercellular spaces. In the patients who had marked lipid infiltration, the lipid appeared either as clear electron-lucid vacuoles which characteristically contained dense, osmiophilic, membranous material or as moderately dense, greyish deposits. In these patients, there was a marked decrease in the number of fat particles within the cisternae and vesicles of the Golgi apparatus. Also, chylomicrons were never seen in the intercellular spaces. The basic defect in these patients may be that of release of fat from the absorptive cell due to reduced synthesis of low density lipoproteins. An incidental observation was the presence of giardiasis in about 80% of the patients.

2332 TROPICAL SPRUE AND MALNUTRITION IN WEST BENGAL. I. INTESTINAL MICROFLORA AND ABSORPTION. (E.) Gorbach, S. L. (U. Illinois Med. Ctr., Chicago), J. G. Banwell, B. Jacobs, B. D. Chatterjee, R. Mitra, N. N. Sen and D. N. Guha Mazumder. *Am. J. Clin. Nutr.* 23(12):1545-1558, 1970.

Small intestine bacterial flora and absorptive function were studied in 15 patients with tropical sprue, 7 with malnutrition without malabsorption, and 13 normal individuals. Low serum folate levels, megaloblastic anemia, and reduced serum albumin levels were seen in both abnormal groups. Biochemical differentiation between the 2 groups could only be made on the basis of fat and B_{12} malabsorption observed in tropical sprue. Bacterial overgrowth of the upper small intestine was noted in all of the sprue cases; an increased number of coliforms was the most consistent finding. Although 4 of 7 malnourished patients had coliforms in the upper intestine, the concentrations were less than 10^4/ml. Coliforms could not be cultured in the intestine proximal to the ileum in normal subjects. Antibiotic therapy was associated with decreased bacterial populations in both abnormal groups and with improved fat and B_{12} absorption in most sprue cases. The bacteria seemingly interfered with absorption in 80% of the sprue cases, and acted as commensals in the malnourished individuals.

2333 TROPICAL SPRUE AND MALNUTRITION IN WEST BENGAL. II. FLUID AND ELECTROLYTE TRANSPORT IN THE SMALL INTESTINE. (E.) Banwell, J. G. (Johns Hopkins Hosp., Baltimore, Md.), S. L. Gorbach, R. Mitra, J. S. Cassells, D. N. Guha Mazumder, J. Thomas and J. H. Yardley. *Am. J. Clin. Nutr.* 23(12):1559-1568, 1970.

Net jejunal and ileal fluid and electrolyte transmucosal fluid transport rates were measured in 13 patients with tropical sprue, 7 patients with protein-calorie malnutrition without evidence of malabsorption, and 13 normal controls. Sodium, chloride and bicarbonate concentrations were similar in all 3 groups, but the potassium content of fluid from tropical sprue and malnutrition was higher than in controls. In all groups, bicarbonate concentration was higher in ileal fluid than in jejunal fluid. Seven patients with tropical sprue showed abnornal fluid secretion (6 in the jejunum; 7 in the ileum), and net ileal fluid secretion was significantly different from net absorption in the other 2 groups. Whereas all ileal studies demonstrated a reversion to net absorption during recovery from the disease, only 4 of 9 demonstrated significant improvement in the jejunum. Initial biopsies in the jejunum and ileum were similar in sprue and malnutrition patients; features included a reduction in villus-to-crypt ratio, increased chronic inflammation of the lamina propria, and a variable degree of abnormality of the surface epithelium.

2334 TROPICAL SPRUE AND MALNUTRITION IN WEST BENGAL. III. BIOCHEMICAL CHARACTERISTICS OF BILE SALTS IN THE SMALL INTESTINE. (E.) Nair, P. P. (Sinai Hosp., Baltimore, Md.), J. G. Banwell, S. L. Gorbach, C. Lilis and A. Alcaraz. *Am. J. Clin. Nutr.* 23(12):1569-1578, 1970.

A detailed biochemical analysis of bile salts in intestinal fluid using recently-developed techniques was conducted on 3 patients with tropical sprue, 1 with protein-calorie malnutrition, and 2 control subjects. Patients with tropical sprue exhibited a decreased glycine-taurine ratio of cholate in duodenojejunal samples, in contrast to protein-calorie malnutrition patients in whom the glycine-taurine ratio was elevated. In 2 of the sprue patients and 1 of the controls, glycochenodeoxycholate was rarely detected, but the corresponding taurine conjugate was present in significant amounts. This condition was not altered by recovery from the disorder. The presence of significant amounts of conjugated lithocholate in aspirates from tropical sprue patients in the pre- and post-treatment phases of the disease, and in control subjects, may reflect active colonization of the intestinal tract by organisms possessing both deconjugating and dehydroxylating functions.

2335 TROPICAL SPRUE AND MALNUTRITION IN WEST BENGAL. IV. BILE SALT DECONJUGATION IN TROPICAL SPRUE. (E.) Cassells, J. S. (Natl. Naval Med. Ctr., Bethesda, Md.), J. G. Banwell, S. L. Gorbach, R. Mitra and D. N. Guhu Mazumder. *Am. J. Clin. Nutr.* 23(12):1579-1581, 1970.

The relationship of bile salt deconjugation in intestinal fluid to the presence or absence of steatorrhea and the bacterial microflora of the same intestinal region was studied in 15 patients with tropical sprue, 7 with protein-calorie malnutrition without steatorrhea, and 11 control subjects. Free bile acids were demonstrated in the terminal ileum of 6 of 15 tropical sprue patients, in 3 of 7 patients with malnutrition and in 4 of the 11 control subjects. In general, taurine derivatives were in greater concentration than those of glycine. The decrease in total conjugates below the critical micellar level does not seem to be responsible for the development of steatorrhea.

2336 LABORATORY CRITERIA FOR THE DIAGNOSIS OF TROPICAL SPRUE IN PUERTO RICO. (E.) Santini, R. (U. Puerto Rice Dept. Med., San Juan), E. Horta, S. Millán, J. Fradera and N. Maldonado. *Am. J. Dig. Dis.* 16(3):241-246, 1971.

Whole blood folate, serum folate, and vitamin B12 levels were determined and xylose absorption tests and jejunal biopsies were performed in 63 untreated patients with tropical sprue. All 63 patients had megaloblastic erythropoiesis and a variable degree of anemia. In the patients with untreated tropical sprue, xylose absorption was decreased to 0.50 g/5 hr (1.8 in controls); serum folate was decreased to 3.0 mμg/ml (12.0 in controls); whole blood folate was decreased to 56 mμg/ml (142 in controls); and serum vitamin B_{12} was reduced to 60 μμg/ml (532 in controls). The xylose absorption test, a jejunal biopsy, and a bone marrow examination are recommended for the establishment of a ready and accurate diagnosis of tropical sprue; serum folate, serum vitamin B_{12}, and whole blood folate levels should be determined for confirmation of the diagnosis.

2337 DIARRHEA DUE TO LACTOSE INTOLERANCE IN ADULTS. (Rev.) (Por.) Gouin, B., J. Duchier, M. Cerf and C. Debray. *Medico (Porto)* 56(983):38, 1970.

2338 GASTROINTESTINAL STARCH INTOLERANCE. (Fr.) Nepveux and G. F. Bonnet. *Ann. Hyg. Langue Fr. Med. Nutr.* 6(3):13-22, 1970.

2339 DISACCHARIDASES IN SMALL INTESTINE DISEASES OF ADULTS. (Fr.) Vachon, A., J. Cotte and M. Abry. *Arch. Fr. Mal. App. Dig.* 59(7-8):502, 1970.

2340 CLINICAL OBSERVATIONS ON PROTEIN-LOSING ENTEROPATHY AND STUDIES WITH THE USE OF ^{131}I-LABELED ALBUMIN. (Pol.) Zychowicz, C. (Provincial Pediatr. Hosp., Olsztyn, Poland), D. Burcz and J. Czarnocki. *Pediat. Pol.* 45(9): 1049-1055, 1970.

2341 GLUTEN-FREE DIET IN THE TREATMENT OF CELIAC DISEASE. OBSERVATIONS AND HYPOTHESES RELATING TO THE TOXICITY OF GLIADIN. (It.) Auricchio, S. (U. Naples Pediatr. Inst., Italy). *Minerva Pediatr.* 22(40):1937-1945, 1970.

2342 ABSORPTION AND MALABSORPTION OF AMINO ACIDS (PART I). (Ger.) Porath, U. (City Hosp., Nuremberg, Germany) and K. Schreier. *Med. Ernahrung* 11(9):205-207, 1970.

2343 URINARY AND FAECAL EXCRETION OF METABOLITES OF TYROSINE AND PHENYLALANINE IN A PATIENT WITH CYSTIC FIBROSIS AND SEVERELY IMPAIRED AMINO ACID ABSORPTION. (E.) Van Der Heiden, C. (Wilhelmina Child. Hosp., Utrecht, Netherlands), S. K. Wadman, D. Ketting and P. K. De Bree. *Clin. Chim. Acta* 31(1):133-141, 1971.

See also numbers: 2100, 2101, 2102, 2103, 2125, 2126, 2288, 2638, 2684, 2697

2344 THE EARLIER DIAGNOSIS OF ADENOCARCINOMA OF THE LARGE INTESTINE. A REPORT OF 1,884 CASES, INCLUDING 5-YEAR FOLLOW-UP SURVIVAL DATA, RESULTS OF SURGERY FOR THE DISEASE, AND EFFECT ON SURVIVAL PROGNOSIS OF TREATMENT EARLIER IN THE DEVELOPMENT OF THE DISEASE. (E.) Gilbertsen, V. A. (U. Minnesota Med. Ctr., Minneapolis). *Cancer* 27(1):143-149, 1971.

The records of patients with adenocarcinoma of the colon and rectum seen at the University of Minnesota Medical Center from 1940 to mid-1963 were examined to assess the extent of changes in proportions of earlier cancers, and to evaluate any improvement in overall survival which may have resulted from early diagnosis. Of the 1884 patients studied, 53.2% had rectal lesions (36.8% ampulla and 16.4% rectosigmoid). Colon tumors in the remaining patients included 18.0% of the sigmoid, 16.2% of the right colon, and 12.6% of the other bowel areas. The absolute 5-yr survival rate for all patients was 30.7%; the least favorable area for survival was the rectum (besides the splenic flexure). There was a substantial increase in the proportion of earlier rectal cancers in patients seen in more recent years. An increase in operative mortality for patients with rectal cancers who underwent resections accounted for a decrease in the 5-yr survival rate. For patients with primary cancer of the colon the increase in the 5-yr survival rate may be associated with significant increases in overall survival as circumstances permit the reduction of rates of operative mortality to 5% or less.

2345 RESULTS OF TREATMENT OF COLORECTAL CANCER AT THE PETER BENT BRIGHAM HOSPITAL FROM 1960 TO 1965. (E.) Botsford, T. W. (Harvard Med. Sch., Boston, Mass.), M. R. Aliapoulios and F. S. Fogelson. *Am. J. Surg.* 121(4):398-402, 1971.

During the 5-yr period from 1960-1965, a total of 222 patients with cancer of the colon and rectum were admitted to the Peter Bent Brigham Hospital for definitive treatment. A total of 206 patients (93.7%) underwent surgery; of these, 146 (70.9%) had operations in hope of cure. The overall 5-yr survival rate for patients undergoing curative resection was 63.5%. Patients without regional lymph node metastases had a 72.3% 5-yr survival, whereas those with regional metastases had a 44.2% 5-yr survival. The best results were obtained in patients with transverse colon lesions without regional node involvement (90% 5-yr survival); even with node involvement, those with transverse colon lesions did better than did patients with other sites of involvement and nodal metastases, contrary to results in a previous study from the same institution. Patients with rectal carcinoma without lymph node metastases had a 5-yr survival of 63.3%; this was the only category in which there was no improvement over a previous study (75% 5-yr survival). Patients with tumors of the ascending and transverse colon showed mild and marked improvement over a previous study. The 5-yr survival for "all comers" was 39.2%.

2346 TREATMENT OF CARCINOMA OF THE LARGE INTESTINE 1939-1968. (E.) Butler, E. C. B. (London Hosp.). *Br. J. Surg.* 58(1): 29-32, 1971.

Results for 865 patients with carcinoma of the large intestine (196 of colon, 669 of rectum) treated by 1 surgeon over a 30-yr period are reviewed. The most frequent site of colonic carcinoma was the sigmoid colon (40%). Most patients presented with a mass in the right side of the abdomen (48%) or with symptoms of pain and anemia (29%). The operative mortality for carcinoma of the colon was 5.1%, and the overall survival rate was 43%. Over a third of the 669 patients with rectal carcinoma presented with rectal bleeding; the remainder had either diarrhea, tenesmus, or rectal pain. The 5-yr survival rate of patients with A and B stage cancer treated by abdominoperineal resection or anterior resection were similar (about 75% for A, and 40% for B stages). The survival rate for patients with cancer confined to the large intestine was 75-90%.

2347 ILEOSTOMY WITHOUT EXTERNAL APPLIANCES: A SURVEY OF 25 PATIENTS PROVIDED WITH INTRA-ABDOMINAL INTESTINAL RESERVOIR. (E.) Kock, N. G. (U. Goteborg Sahlgrens Hosp., Sweden). *Ann. Surg.* 173(4):545-550, 1971.

All 25 patients undergoing proctocolectomy survived operation without serious complication, and emptied their ileostomy reservoirs through a plastic tube 1 to 4 times a day. Nine patients had a completely continent ileostomy, with neither feces nor gas being involuntarily expelled through the ileostomy. In 13 patients only gas occasionally escaped. Twenty-two patients never used external ileostomy appliances, keeping the ileostomy covered by compresses. Skin irritations were nonexistent in all patients, including those in which the reservoir was created at secondary surgery because of consistent skin irritation. The capacity of the reservoir, which at surgery was approximately 70 ml. increased during the first 3 months after the operation to around 500 ml. The provision of an intra-abdominal ileal reservoir should be applied only to patients operated upon electively for ulcerative colitis or Crohn's disease, not in patients preoperatively treated with steroids.

2348 FLUOROURACIL AS AN ADJUVANT TO SURGERY IN CARCINOMA OF THE COLON. (E.)

iggins, G. A. (VA Hosp., Washington, D. C.), R. ', Dwight, J. V. Smith and R. J. Keehn. *Arch urg.* 102(4):339-343, 1971.

f 433 patients undergoing surgery for carcinoma f the colon in conjunction with fluorouracil reatment, final analysis showed that 308 were linically curative, 70 were proved palliative, nd 55 were clinically palliative. Survival urves for curative cases receiving fluorouracil 4.5 yr after randomization) revealed a life-able survival of 56%, compared to 50% in controls. urvival at 18 months in the group proved palliaive was 30% in treated patients and 16% in conrols receiving no fluorouracil. In the clinially palliative group, survival rates were 57% nd 31% for treated and control groups, resp. lthough the above increases were not statistically ignificant, the case for the beneficial drug ffect was strengthened by the observation that reated survival exceeds control survival for ach of the 3 clinical/pathological classificaions. Toxic effects of fluorouracil consisted argely of gastrointestinal symptoms and evidence f bone marrow depression.

349 TUMOR RECURRENCE IN COLON ANASTOMOSES: PREVENTION BY COAGULATION AND FIXATION ITH FORMALIN. (E.) Douglass, H. O., Jr. and . H. LeVeen (State U. New York Downstate Med. tr., Brooklyn). *Ann. Surg.* 173(2):201-205, 971.

arious types of anastomoses were made in the scending colons of rabbits following an injecion of isolated Brown-Pearce tumor cells into he area, to test the hypothesis that tumor cells re a factor in the incomplete sealing of anasomoses. Anastomotic tumor was formed in 25% f routine open 2-layered anastomoses, but topical pplication of formalin significantly reduced the ransplantation of tumor to 4%. Closed technique id not prevent anastomotic tumors which occurred n 25% of routinely closed anastomoses. The ddition of chemical coagulation with phenol on ormalin applied topically did not reduce the ate of tumor transplantation. Electrocoagulaion provided some protection, but not at a sigificant level. Technical differences (e.g., 2-ayered anastomoses, scrupulous local cleansing, nd isolation of anastomoses from peritoneal cavty and mesentery with drapes) may explain the educed incidence of anastomotic tumor in control nimals.

350 STUDIES OF COLONIC CARCINOMA ANTIGENS. (E.) Kleinman, M. S. (U. Rochester ch. Med. Dent., N. Y.), L. Harwell and M. D. urner. *Gut* 12(1):1-10, 1971.

he extraction and partial purification of antienic substances from human colonic carcinoma, nd the production of absorbed rabbit antisera gainst them are described. Pooled samples of normal colonic mucosa, either from patients with colon carcinoma or from normal subjects, showed no antigenic activity. No precipitin lines could be detected on immunodiffusion against normal human plasma, serum, or colon; however, 2 distinct precipitin lines were observed against the perchlorate extract of colonic carcinoma. Pooled normal antigens to the absorbed antiserum had no effect on the precipitin reactions other than that due to dilution. The 2 precipitates were determined to be 2 distinct IgG proteins using diethylaminoethyl-cellulose column chromatography and immunoelectrophoresis; however, the antigen could not be separated into 2 distinct components.

2351 MUCOSUBSTANCES IN NEOPLASMS OF THE HUMAN COLON AND RECTUM. (E.) Subbuswamy, S. G. (St. Tydfils Hosp., Merthyr Tydfil, Wales). *Gut* 12(3):200-207, 1971.

Studies were performed on the pattern of mucosubstances secreted by the large intestine. Specimens consisted of 12 surgically-resected benign tumors (6 adenomatous polyps, 5 papillary adenomas, 1 villous papilloma), 32 specimens of rectum and colon resected for carcinoma, and 20 controls. The villous papilloma contained a very small amount of sulfated mucosubstance on the villi; the rest of the secretion consisted of entirely nonsulfated acid mucosubstance. In the adenomatous polyps and papillary adenomas, most secretion consisted of nonsulfated acid mucosubstance. All but 1 adenomatous polyp contained scanty-to-small amounts of sulfated mucosubstance confined to the deeper parts of the polyps; this was also seen in the papillary adenomas in which the papillary processes invariably contained less mucosubstance than the deeper parts. In every case, the tumor tissues contained less mucosubstance than normal tissues, and the amount of mucosubstance corresponded to the extent of histological differentiation. In 3 of the malignant specimens, almost no secretion was observed and another contained only neutral mucosubstance. In other cases, the secretion was composed almost entirely of acid nonsulfated mucosubstances, or mixtures of acid nonsulfated and neutral mucosubstance. In 12 cases, there was no sulfated mucosubstance, while the remainder contained scanty sulfated mucosubstance arranged, in most cases, as a ring along the periphery of mucous globules. There was no relationship between the pattern of mucosubstance secretion and the degree of tumor differentiation. The mucosa around tumor areas and in those of nonpolypoid hyperplasia showed 2 constant patterns, 1 consisting of very small amounts of secretion (mainly sulfated mucosubstance) and 1 with normal or increased amounts of secretion (mainly acid nonsulfated mucosubstance).

2352 INTESTINAL SPIROCHAETOSIS. (E.) Lee, F. D. (U. Glasgow Western Infirm., Scotland) A. Kraszewski, J. Gordon, J. G. R.

Howie, D. McSeveney and W. A. Harland. *Gut* 12(2):126-133, 1971.

Biopsies and surgically-excised pieces of the large intestine from patients with various large intestine disorders were examined by light and electron microscope. The initial rectal biopsy demonstrated free surfaces of epithelial cells coated with spiral organisms (3 μ by 0.2 μ in dimension). Hematoxylin- and eosin-stained sections from this biopsy revealed a distinct blue zone in the region of the brush border which was blackened by silver stains and stained positively with period acid Schiff. In all cases, spirochete infestation was limited to the surface epithelium and seldom extended for more than a short distance into the crypts. Spirochetosis was found in 6.9% of 944 rectal biopsies and in 7.8% of 790 removed appendices. In most of the 14 cases of spirochetosis studied, the symptoms could be readily attributed to the underlying disease (usually tumor). There were no symptoms or clinical features which distinguished these cases from comparable appendectomy cases without spirochetosis.

2353 THE EFFECTS OF DIVERSION OF INTESTINAL CONTENTS ON THE PROGRESS OF CROHN'S DISEASE OF THE LARGE BOWEL. (E.) Burman, J. H. (Gen. Hosp., Birmingham, England), H. Thompson, W. T. Cooke and J. A. Williams. *Gut* 12(1):11-15, 1971.

In 29 patients (15 men, 14 women) with Crohn's disease of the large intestine in whom defunctioning ileostomy or colostomy had been performed, evaluations of (1) clinical improvement after diversion, (2) the degree of resolution of disease activity in the bypassed intestine, and (3) the feasibility and success of restoration of continuity were made, with a mean follow-up of 10 yr. Following diversion, all patients but 1 showed improvement in general health. The defunctionalized intestine which was later excised in 15 patients (mean 37 months later) did not show a return to normal; in 8 other patients with retained rectal remnants, biopsies showed general improvement after diversion, but none were considered normal. Of 5 patients having restoration of the fecal stream, only 2 were successful, and in neither patient did the histological findings at biopsy return to normal. There is only a small chance that "resting" the large intestine by diversion will allow sufficient healing in Crohn's colitis to permit restoration of the fecal stream.

2354 ISCHAEMIC COLITIS. (E.) Möller, C. (Univ. Hosp., Helsinki, Finland) and L. Stjernvall. *Acta Chir. Scand.* 137(1):75-79, 1971.

The records of 7 patients with ischemic colitis where the lesion was not at the usual site of the splenic flexure were reviewed, and experiments were performed on 23 cats to study the impeded neuromuscular function of an ischemic colonic segment. In 2 cases, the inflammatory process was transitory; the edema, bleeding, and spasm subsided within 4 days. In 3 cases, the process developed into a persistent fibrotic constriction. In 2 cases, the ischemia rapidly developed into colonic gangrene. Ischemia was induced in cats by ligation of the marginal blood vessels with size 0000 atraumatic silk for a 5-cm segment of the ascending colon. The intestinal musculature responded immediately with powerful contractions, followed by reduced or absent spontaneous motor activity and spasm. Ischemic colonic musculature showed a lowered reactivity to parasympathetic stimulation. Stretching of the intestinal wall with a balloon provoked prolonged tone elevation in the ischemic segment.

2355 THE OUTCOME IN 455 PATIENTS ADMITTED FOR TREATMENT OF DIVERTICULAR DISEASE OF THE COLON. (E.) Parks, T. G. (Queen's U. Dept. Surg., Belfast, Ireland) and A. M. Connell. *Br. J. Surg.* 57(10):775-778, 1970.

Various medical and surgical treatments were assessed in 455 patients admitted to the Royal Victoria Hospital for diverticular disease of the colon. A third of the patients required surgery, while the others were treated medically. Poor results were observed after colostomy and drainage as emergency treatment (7.3% mortality), resection and anastomosis in the presence of acute inflammation (14.3% mortality), and closure of a proximal colostomy without resection of the area of complication (12.5% mortality). Incision and drainage of a well-localized pericolic abscess was sometimes justifiable, but a proximal colostomy was desirable. A quarter of the medically-treated patients had to be readmitted for treatment. While 43% exhibited persistence of symptoms after medical treatment, 32.7% showed symptoms after surgery.

2356 BEHAVIOUR OF THE RECTAL JUVENILE POLYP IN VITRO. (E.) Römer, H. (Ninos de Caracas Hosp., Caracas, Venezuela), C. Cotte and E. Essenfeld-Yahr. *Gut.* 12(3):194-196, 1971.

Ten specimens (9 juvenile polyps, 1 adenoma) were removed by diathermy or by simple section of the pedicle through a sigmoidoscope. Six of the patients had previously received chloramphenicol and tetracycline. Specimens were studied histologically and in culture after trypsinization. Of the 9 polyps, 3 failed to proliferate in vitro while the other 6 survived and developed for 2-7 weeks; the single adenoma failed to grow. Epithelial cells were not seen in any cultures and in those showing growth, only fibroblasts developed. Of the 6 positive cultures, 2 showed profuse growth and cellular proliferation persisting throughout the first 7 days. Aging with degeneration and loss of the culture was always marked by vacuolization of the cytoplasm. Cellular proliferation of polyps was not seen in those from patients who had not received antibiotics or when the seeding was not performed immediately after removal of the specimen.

2357 ELECTRON MICROSCOPY OF MYENTERIC NERVES IN HIRSCHSPRING'S DISEASE AND IN NORMAL BOWEL. (E.) Howard, E. R. (King's Coll. Hosp., London) and J. R. Garrett. *Gut* 11(12):1007-1014, 1970.

The ultrastructure of colonic and rectal specimens from 10 children with Hirschsprung's disease were compared with normal infant intestine to establish the normality or abnormality of individual myenteric axons, and to determine whether neuro-effector sites exist. In all cases of Hirschsprung's disease, large nerve trunks composed of hundreds of axons enclosed within a sheath of perineural cells and collagen were found in the intermuscular zone. The most distal segment of aganglionic intestine in 7 of 10 cases contained numerous nonmyelinated nerves in the muscle layers; these nerves appeared similar to those considered to be neuro-effector sites in the normal, in which an axon was in close proximity to a muscle cell with a gap of 50 mμ or less. More proximal portions of the intestine always showed decreased numbers of nerves in the circular muscle. Invariably in the most distal ganglionic tissue, very few muscular nerves and correspondingly few "neuro-effector sites" were found. Hirschsprung's disease seems to be due to an abnormality in the myenteric nerves and ganglia of the intestinal wall.

2358 HIRSCHPRUNG'S DISEASE REVISITED: PART I. PRELIMINARY REPORT. (E.) Hovnanian, A. P. (Huron Rd. Hosp., Cleveland, Ohio) and R. Golkar. *Dis. Colon Rectum* 14(2):108-116, 1971.

To investigate whether aganglionosis is the cause of Hirshspring's disease, the muscularis (which contains the Auerbach's ganglion cells between the outer longitudinal and inner circular muscle layers) of a 20-25 cm segment of canine colon was stripped. Myomectomy specimens contained the parasympathetic ganglia of the colon; no ganglion cells were left behind on the gut wall. Proximal dilation of the colon (evidence of Hirschsprung's disease) or narrowing of the ganglionectomized segment were not observed in barium enema studies. Obstipation or constipation did not develop; intraluminal pressure studies showed normal peristaltic pressure waves above the site of myomectomy, and absent or diminished peristaltic pressure waves at the site of surgery. Aganglionosis, a constant finding in Hirschsprung's disease, is probably not an etiologic factor in the production of that type of megacolon.

2359 PITFALLS IN THE DIAGNOSIS AND TREATMENT OF HIRSCHSPRUNG'S DISEASE. (E.) Tank, E. S. (U. Michigan Med. Sch., Ann Arbor). *Arch. Surg.* 102(4):332-334, 1971.

The records of 50 cases of aganglionic megacolon (Hirschsprung's disease) treated at the University of Michigan Medical Center were reviewed with regard to diagnosis, treatment, and mortality. The overall mortality in this group was 16% (8 patients). Six infants died of complications resulting from late diagnosis of the disease; 4 died of enterocolitis and 2 of peritonitis after intestinal proliferation. Two other infants died of associated congenital anomalies (due to Down's Syndrome). The only way to conclusively make the diagnosis of aganglionic megacolon was by full-thickness rectal biopsy. Fecal diversion, usually carried out prior to the definitive pull-through procedure was most successfully performed by right transverse colostomy. Thirty-one of the patients underwent definitive pull-through procedures with no operative deaths; Grob's modification of the Duhamel procedure was associated with the least complication.

2360 ADENOCARCINOMA OF THE APPENDIX. (Rev.) (E.) Flint, F. B. (VA Wadsworth Gen. Hosp., Los Angeles, Calif.), A. M. Kahn and E. Passaro, Jr. *Am. J. Surg.* 120(6):707-709, 1970.

2361 PRIMARY APPENDICEAL ADENOCARCINOMA. (E.) Otto, R. E. (Northwestern U. Med. Sch., Chicago, Ill.), E. V. Ghislandi, G. A. Lorenzo and J. Conn, Jr. *Am. J. Surg.* 120(6): 704-706, 1970.

2362 METAPLASIA AND ADENOMA OF THE APPENDICULAR MUCOSA. (Ger.) Stejskalova, A. *Zentralbl. Allg. Pathol.* 113(4):471, 1970.

2363 CLINICAL AND RADIOLOGICAL PARALLELS IN CHRONIC APPENDICITIS. (Rus.) Schekotov, G. M. and S. G. Zhukova. *Khirurgiia (Mosk.)* (10):79-83, 1970.

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2366 SUBPHRENIC ABSCESS IN CHILDREN. CHARACTERISTICS, ORIGIN, AND PRINCIPLES OF THERAPY. (Rev.) (Fr.) Brunet, J. P. (Bretonneau Hosp., Paris), Y. Laburthe Tolra and M. Boureau. *Rev. Prat. (Paris)* 20(24):3655-3656, 1970.

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2387 NECROTIZING PROCTITIS CAUSED BY INJECTION OF BARIUM INTO THE WALL OF THE RECTUM:

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2395 STENOSING LESIONS OF THE COLON SECONDARY TO PANCREATITIS. (E.) Mohiuddin, S., P. Sakiyalak, H. D. Gullick and W. R. Webb (State U. New York Upstate Med. Ctr., Syracuse). *Arch. Surg.* 102(3):229-231, 1971.

e also numbers: 2128, 2129, 2130, 2131, 2132, 2284, 2287, 2309, 2313, 2317, 2320, 2398, 2400, 2614, 2626, 2680, 2687

ULCERATIVE COLITIS

396 JEJUNAL ABSORPTION OF WATER AND ELECTROLYTES IN INFLAMMATORY BOWEL DISEASE. E.) Binder, H. J. (Yale U. Sch. Med., New Haven, onn.) and T. Ptak. *J. Lab. Clin. Med.* 76(6): 15-924, 1970.

egmental perfusion studies were performed in he jejunum of 8 controls and 18 patients with nflammatory bowel disease by passage of 3 fused olyvinyl tubes whose apertures lay at different evels. In controls, there was greater absorption f water, sodium, and chloride during infusion f a glucose-saline solution than during infusion f an isotonic saline solution. With perfusion f isotonic saline in 4 patients with ulcerative olitis who were not receiving corticosteroids, here was marked depression of absorption of ater, sodium, and chloride; net secretion of ater and sodium was seen in 2 of the 4 patients. n 4 ulcerative colitis patients receiving corticosteroids, absorption of water, sodium, and hloride was greater than control levels. Water bsorption in colitis patients not treated with teroids was significantly less than that in ontrols, steroid-treated colitics and nonsteroid-treated regional enteritis patients. After perfusion of glucose-saline, water absorption was reater in steroid-treated colitis patients than in nonsteroid-treated patients, but the difference was not significant. The presence of glucose resulted in stimulation of water, sodium, and chloride in both colitis groups; these results were similar to those in controls. After isotonic saline, water absorption was similar in steroid-treated and nontreated patients with regional enteritis; the results with sodium and chloride were also similar to controls. Absorption of water, sodium, and chloride from glucose-saline was also normal in enteritis patients.

2397 A CLINICO-IMMUNOLOGICAL STUDY OF ULCERATIVE COLITIS AND ULCERATIVE PROCTITIS. (E.) Smith, A. H. (U. Liverpool Dept. Surg., England) and I. W. MacPhee. *Gut* 12(1):20-26, 1971.

Serum proteins and immunoglobins of 15 patients suffering from ulcerative colitis and 11 patients with ulcerative proctitis were studied, and the clinical course of these conditions were compared. Patients with ulcerative proctitis had lower total protein concentrations than either the ulcerative colitis group or controls. Patients with ulcerative colitis demonstrated significant increases in serum α_2-, β-, and γ-globulins, and IgA and IgG concentrations. Total colectomy had little effect on serum IgA or IgG concentration, however rectal resection caused a decrease in IgG concentration. Serum globulin and immunoblobin concentrations were within normal limits in patients with ulcerative proctitis. Ulcerative proctitis does not seem to be a mild form of ulcerative colitis as each disease has a distinct clinical course. Serum immunoglobin tests may provide a useful additional test for distinguishing between the two disorders.

2398 THE VALUE OF ELECTRON MICROSCOPE STUDIES IN DIAGNOSING MALIGNANT CHANGE IN ULCERATIVE COLITIS. (E.) Jenkinson, J. A. (Westminster. Hosp. Med. Sch., London) and I. M. P. Dawson. *Gut* 12(2):110-118, 1971.

Specimens of colonic and rectal mucosa were obtained from patients with carcinoma of the colon and from patients with ulcerative colitis and examined histologically and electron microscopically. Two of 5 patients with true ulcerative colitis showed the polypoidal pattern of precancerous change histologically, as well as extensive ultrastructual changes. Changes included stratified, enlarged, and irregularly-shaped nuclei and changes in the relationships of adjacent cells. Histological studies on the transitional mucosa immediately adjacent to the 11 carcinomas showed no recognizable abnormality. Premalignant changes in ulcerative colitis seem to be more easily detected by simple histology than by electron microscopy.

2399 *ABNORMAL LACTIC DEHYDROGENASE ISOENZYME PATTERNS IN ULCERATIVE COLITIS WITH PRECANCEROUS CHANGE. (E.) Lewis, B. (St. Mark's Hosp., London), B. C. Morson, A. W. February, J. H. Jones and J. J. Misiewicz. *Gut* 12(1):16-19, 1971.

Lactic acid dehydrogenase (LDH) isoenzyme distribution was determined in rectal biopsies from patients with ulcerative colitis, with and without histological evidence of precancerous changes, and in a control group. Ulcerative colitis uncomplicated by precancer was associated with a slight increase in the mean LDH ratio, but there was considerable overlap. A marked preponderance of slow-migrating isoenzymes of LDH (IV & V) was found in the rectal mucosa of colits patients with histological features of precancer. Total LDH activity in the biopsy material was 154 ± 76 IU/g in the control group, 144 ± 126 IU/g in total colitis, 139 ± 72 IU/g in distal colitis, and 60 ± 43 IU/g in colitis with precancer. LDH isoenzyme determination may aid in the recognition of precancer in ulcerative colitis.

2400 TOXIC MEGACOLON IN ACUTE FULMINANT ULCERATIVE COLITIS. (E.) Foley, W. J. (U. Michigan Med. Ctr., Ann Arbor), W. W. Coon and R. E. Bonfield. *Am. J. Surg.* 120(6):769-774, 1970.

In a series of 150 consecutive patients with ulcerative colitis who underwent colectomy and ileostomy, 28 developed acute toxic dilatation of the colon during an attack of ulcerative colitis. In the 28 patients, the interval from onset of disease until development of toxic megacolon was less than 3 months (in 13) and less than 1 yr. (in 18). All but 5 had an attack lasting from 1-4 weeks before surgery. Of the 5 with acute symptoms for more than 4 weeks, there was an initial episode of ulcerative colitis in all but 1. All 28 were anemic, but in most cases the WBC did not correlate well with the overall severity of the attack (as seen clinically by toxicity, tachycardia, and fever). Barium enema was not routinely performed in these patients. At the time of acute toxic dilatation, 8 also had marked rectal bleeding. In 22, colectomy was performed without removal of the rectum, while total coloproctectomy was performed in 5; in 1 patient in whom perforation occurred preoperatively, loop ileostomy was performed initially, and subtotal colectomy and ileostomy were done 16 days later. Perforation of the colon occurred in 12 patients. Prior to admission, 11 had received steroids and 6 of these showed perforated colons. The postoperative course was uncomplicated only in 4 with nonperforation. Sepsis developed in all with perforation, and was the cause of death in 7 of the 9 who died postoperatively. Two patients without perforation died, 1 because of unrecognized postoperative intra-abdominal bleeding, the other because of unexplained hypotension immediately postoperatively. Of the 9 deaths, only 1 was in a case of total coloproctectomy. Of the 15 who survived subtotal colectomy, 11 required abdominoperineal resection within 3 yr because of significant rectal symptoms; of the remaining 4, survival at this time has been less than 6 months after subtotal colectomy.

2401 RADICAL SURGERY FOR ULCERATIVE COLITIS DURING PREGNANCY. (E.) Flatmark, A. L. (Natl. Hosp. Oslo, Norway), A. Nordöy and E. Gjone. *Scand. J. Gastroenterol.* 6(1):45-47, 1971.

A 21-yr-old pregnant woman with fulminating ulcerative colitis in the last trimester underwent radical surgery. Cesarian section was done first; this was followed by colectomy with permanent ileostomy and a temporary sigmoidostomy. The child weighed 1200 g and had no sign of malformations. The mother had an uneventful recovery and was discharged 1 month after admission. On follow-up 4 months later, the mother still produced enough milk, and all her laboratory data were normal including vitamin B_{12} absorption.

2402 DELAYED ILEORECTAL ANASTOMOSIS IN THE SURGERY OF ULCERATIVE COLITIS. (E.) Aylett, S. O. (Gordon Hosp., London). *Br. J. Surg.* 57(11):812-813, 1970.

eventeen of 20 patients with ulcerative colitis n whom delayed ileorectal anastomosis was perormed returned to full health. Similar recovery igures have been achieved for a large number of ases in whom colectomy and restoration of coninuity has been the method of selected treatment. ne progress of the patients in this study, some ver a period of many yr, indicates that rectal olation is not essential for the surgical cure f most cases of ulcerative colitis. When ileoectal anastomosis is considered, the open end f the colon or rectum should be exteriorized, and ot treated as in a Hartmann operation.

403 SURGICAL TREATMENT OF SEVERE ATTACKS OF ULCERATIVE COLITIS, WITH SPECIAL REFERNCE TO THE ADVANTAGES OF EARLY OPERATION. (E.)
oligher, J. C. (Gen. Infirm., Leeds, England), . C. Hoffman and F. T. de Dombal. *Br. Med. J.* (5737):703-706, 1970.

he records of 247 patients who were admitted to he General Infirmary at Leeds for colitis (258 ttacks) were examined with regard to the outcome f surgical treatment. Ileostomy with proctoolectomy or subtotal colectomy was performed f medical treatment did not lead to remission. he mortality rate in medically treated patients as 4.8% in the 1952-1963 group and 0.7% in the 964-1969 group. The operative mortality for oth groups was 20.0% and 7.0%, resp.; the over-ll mortality was 11.3 and 4.5%, resp. Sepsis eemed to be the major factor involved in death f these patients. Of the 112 patients who were perated upon during attacks during 1952-1969, 1 patients had perforation, with a mortality of 8.6%. Twenty-eight patients had acute colonic ilatation which was treated surgically with a ortality of 18.5%. Of the 140 patients who urvived severe attacks with medical treatment lone during the entire period (1952-1969) 52 37.1%) subsequently returned for elective or mergency surgery. In 17 of the 247 cases, opertive specimens showed the features of Crohn's olitis rather than ulcerative colitis.

404 TRENDS IN MORTALITY FROM ULCERATIVE COLITIS IN ENGLAND AND WALES. (E.)
vans, J. G. (London Sch. Hyg. Trop. Med.). *Gut* 2(2):119-122, 1971.

rends in mortality for men and women with ulcertive colitis in England and Wales were observed rom 1940 to 1967. For both sexes, the rates fell uring 1940-1945 and were fairly stable from 1947 ntil 1957. A downward trend has been observed ince 1958. In females, the mean mortality rate n the period 1963-1967 was 24% less than that in he period 1953-1957; the decrease for the corresponding period in males was 14%. Overall incidence, prevalence, and total mortality rates were higher in females than in males. Among those 15-34 yr of age, mortality rates fell with only minor irregularities during the 20-yr period at risk. Those over 65 yr showed increasing mortality rates through the period with some tendency to stabilize toward the end of the period. In those 35-64 yr old, the rate was fairly constant from 1946 until 1958, at which time it began to decline.

2405 CARRAGEENAN-INDUCED ULCERATION OF THE LARGE INTESTINE IN GUINEA PIG. (E.)
Watt, J. (U. Liverpool Dept. Pathol., England) and R. Marcus. *Gut* 12(2):164-171, 1971.

Carrageenan, derived from the red seaweed Eucheuma spinosum, was degraded by mild acid hydrolysis so as to retain about 29% sulphate content. Guinea pigs received a 5% solution of this carrageenan in their drinking water in daily doses of less than 2 g/kg for 20-45 days. Compared with controls, all animals receiving carrageenan showed a loss of weight which became apparent after the 2nd week. By the end of the experiment, the weight losses ranged from 80-150 g and represented 15-25% of the initial body weight. By the end of the 1st week of the study, most animals had loose stools. During the first 2 weeks, stools were negative for occult blood; by day 18, 50% were positive and, by day, all 30 were positive. By the 2nd day, Metachromasia was seen in toluidine blue fecal and urinary smears from all animals. Large bowel ulceration occurred in 12 of 14 animals during the course of the experiment; ulcer occurred in 2 of 4 sacrificed at days 20-25, and in all those sacrificed after that time. The extent and severity of ulcers varied with length of carrageenan administration. Ulcers developed initially in the cecum and later in the colon and rectum; cecal ulcers were more extensive than the rest. Macroscopically and microscopically, the observed lesions resembled those occurring in ulcerative colitis in humans.

2406 CHANGES IN THE ELECTROLYTE AND ACID-BASE BALANCE IN NONSPECIFIC ULCERATIVE COLITIS. (Rus.) Iukhvidova, Z. M., M. K. Levitan, O. I. Dimant and A. M. Brandina. *Sov. Med.* 33(6):133-137, 1970.

2407 CARRAGEENAN ULCERATION AS A MODEL FOR HUMAN ULCERATIVE COLITIS. (E.)
Sharratt, M. (British Indust. Biol. Res. Ass., Carshalton, England) P. Grasso, F. Carpanini and S. D. Gangolli. *Lancet* 1(7691):192-193, 1971.

See also numbers: 2133, 2219, 2441, 2597, 2626

2408 THE SIGNIFICANCE OF PANCREATIC HETEROTOPIA IN RELATION TO CANCER OF THE HEAD OF THE PANCREAS. (E.) Douglass, H. O., Jr., J. V. Sika and H. H. LeVeen (VA Hosp., Brooklyn, N. Y.). *Gastroenterology* 59(6):860-861, 1971.

Pathological findings from 64 patients who had pancreatoduodenal resections were reviewed to assess the significance of pancreatic heterotopia in relation to cancer of the head of the pancreas. In 32 of 50 resections for malignant disease, the carcinoma originated in the head of the pancreas. Periampullary carcinoma led to 17 resections, and 1 was performed for a carcinoma arising in the hepatic flexure of the colon, directly extending into the pancreas and duodenum. Twelve resections were done for pancreatitis, and 1 each for regional enteritis of the duodenum and for a benign functioning islet cell tumor. Heterotopic pancreatic tissue was found in the duodenum in 20 of the 64 subjects. Ectopic pancreas was present in 50% of the cases of carcinoma of the head of the pancreas, 12% of the periampullary tumors, and 18% of the resections for pancreatitis.

2409 VITAMIN B_{12} MALABSORPTION IN CHRONIC PANCREATIC INSUFFICIENCY. STUDIES SUGGESTING THE PRESENCE OF A PANCREATIC "INTRINSIC FACTOR." (E.) Toskes, P. P. (U. Pennsylvania Sch. Med., Philadelphia), J. Hansell, J. Cerda and J. J. Deren. *N. Engl. J. Med.* 284(12): 627-632, 1971.

Urinary excretion of orally-administered ^{57}Co-labeled vitamin B_{12} was studied in 22 patients with pancreatic exocrine insufficiency. Nine excreted less than 8% within 24 hr. Known causes of vitamin B_{12} malabsorption were not present. The pH and total calcium of ileal contents were similar in patients with pancreatic insufficiency whether they absorbed vitamin B_{12} normally or abnormally. No correlation was noted between vitamin and fat malabsorption. Pancreatic extract (2-12 g) given to 4 of 9 patients with B_{12} malabsorption improved the urinary excretion from 4.0 ± 0.64% to 18.0 ± 2.63%. Therefore, some patients with pancreatic insufficiency have malabsorption of vitamin B_{12}, and the pancreas may have a role in the absorption of this vitamin.

2410 PANCREATIC TRAUMA. (E.) Jones, R. C. (U. Texas Southwestern Med. Sch., Dallas) and G. T. Shires. *Arch. Surg.* 102(4):424-430, 1971.

Records of 175 patients treated for pancreatic injury were analyzed for the type of injury, diagnosis, location and severity, method of management, complications, and mortality. The mortality for penetrating injuries and blunt trauma to the pancreas was 19% and 18%, respectively. Ninety-one per cent of patients with blunt trauma had a preoperative elevation of the serum amylase, while only 27% of the patients with penetrating trauma showed elevated serum amylase levels. Mortality was higher when injury was to the head of the pancreas, and these injuries were the most difficult to manage because of associated major vessel injury. The pancreatic injury accounted for less than 5% of the 32 deaths. Roux-en-Y anastomosis suturing both ends of the pancreas to the superior mesenteric vessels or distal pancreatectomy proved to be satisfactory treatment for the completely transected pancreas depending on the site of injury. Pancreaticoduodenectomy was preferred as treatment for severe crushing injuries to the head of the pancreas with or without associated duodenal trauma.

2411 OSTEOBLASTIC METASTASES IN CARCINOMA OF PANCREAS. (E.) Joffe, N. (Beth Israel Hosp., Boston, Mass.). *Br. J. Radiol.* 44(519):226, 1971.

2412 THE ADVANTAGES OF BYPASS OPERATIONS OVER RADICAL PANCREATODUODENECTOMY IN THE TREATMENT OF PANCREATIC CARCINOMA. (E.) Crile, G., Jr. (Clin. Found. Dept. Gen. Surg., Cleveland, Ohio). *Surg. Gynecol. Obstet.* 130(6):1049-1053, 1970.

2413 "BLUE DOME" PSEUDOCYST OF THE PANCREAS. (E.) Rogers, J. B., (Hahnemann Med. Coll., Philadelphia, Pa.), A. E. Pearce and J. M. Howard. *Am. J. Surg.* 120(6):813-814, 1970.

2414 PSEUDOCYSTS OF THE PANCREAS TREATED WITH LOCAL APPLICATION OF A ^{90}Y SOLUTION. REVIEW AND CASE REPORT. (Swe.) Werner, G. (Karolinska Hosp., Stockholm, Sweden) and L. Johansson. *Opusc. Med.* 15(9):325-328, 1970.

2415 PANCREATIC CYSTADENOMA. (Rev.) (It.) Bellantuono, N. (St. Giacomo City Hosp., Torremaggiore, Italy) and P. Santagata. *Rass. Int. Clin. Ter.* 50(15):934-943, 1970.

2416 INFLAMMATION OF ECTOPIC PANCREAS. (Rus.) Karpukhin, V. I. and L. F. Biriukov. *Vestn. Khir.* 105(7):106-107, 1970.

2417 DIAGNOSTIC STUDY OF CYSTIC FIBROSIS. (Sp.) Bueno, M., (U. Navarra Sch. Med., Spain), A. Delgado and J. Argemi. *Rev. Esp. Pediatr.* 26(154):465-492, 1970.

2418 CHANGING PATTERNS OF GASTROINTESTINAL MANIFESTATIONS OF CYSTIC FIBROSIS.

PANCREAS

SURVEY OF RECENT PROGRESS IN DIAGNOSIS AND TREATMENT. (E.) Grand, R. J. (Harvard Med. Sch., Boston, Mass.). *Clin. Pediatr. (Phila.)* 9(10): 588-593, 1970.

2419 THE HEARING OF PATIENTS WITH CYSTIC FIBROSIS. (E.) Kulczycki, L. I., (Child. Hosp. District of Columbia, Washington, D.C.), J. S. Butler, D. McCord-Dickman and G. R. Herer. *Arch. Otolaryngol.* 92(1):54-59, 1970.

2420 MUCOVISCIDOSIS. (Fr.) Hennequet. A. *Gaz. Med. Fr.* 77(23):4923-4928, 1970.

See also numbers: 2134, 2135, 2136, 2137, 2163, 2242, 2307, 2617

PANCREATITIS

2421 CORRELATION OF THE HISTOLOGIC OBSERVATIONS AND OPERATIVE FINDINGS IN PATIENTS WITH CHRONIC PANCREATITIS. (E.) Howard, J. M. (Hahnemann Med. Coll. Hosp., Philadelphia, Pa.) and A. Nedwich. *Surg. Gynecol. Obstet.* 132(3): 387-395, 1971.

Patients, according to clinical observations, were divided into 3 groups, those with minimal, moderately advanced, or advanced pancreatitis. Early stages of the disease were characterized histologically by an accentuation of coarse lobulations due to an increase in connective tissue which insinuated between the pancreatic lobules with moderate inflammatory reaction. The pancreatic lobules varied in size and showed focal, irregular areas of scarring. At operation, in the moderately advanced group, the pancreas appeared enlarged and indurated; pancreatography revealed slight but definite, dilatation of the main duct and 1 or 2 of the smaller ductal tributaries. Histologically, there was a greater increase in interstitial connective tissue, with further acinar loss in an irregular manner. The main ducts coarsed irregularly, often forming irregular sacculations. A relative increase was noted in the number of islets, some of which appeared hyperplastic. In the advanced stage of pancreatitis, the pancreas was small, occasionally reduced to a contracted pancreatic cord. Dilatation of the main duct and a large number of tributaries was also observed. Histologically, the advanced stage was characterized by residual dilated ducts, dilated and regenerating terminal intralobular ductules, and hyperplastic islets surrounded by fibrous tissue with almost complete acinar loss. A correlation between the appearance of the pancreas (gross and pancreatographic) and histologic findings was fairly close.

2422 PLATELET RESPONSE TO INDUCTION OF HEMORRHAGIC PANCREATITIS. (E.) Byrne, J. J. (Boston U. Surg. Res. Lab., Mass.), J. J. Migliore, W. Beekley, V. A. Guardione and L. F. Williams, Jr. *Proc. Soc. Exp. Biol. Med.* 136(3): 994-996, 1971.

Hemorrhagic pancreatitis was produced by infusion of Pfeffer fluid into the main pancreatic ducts in 4 groups of animals: Group I, 13 control dogs; Group II, 9 dogs received dipyridamole i.v. (2 mg/kg body weight); Group III, 8 dogs received 600 mg acetylsalicylic acid p.o. the day before and on the day of pancreatic duct infusion; and Group IV, 6 dogs received 500 mg sodium salicylate i.v. prior to pancreatic duct infusion, and 1 g during the test period. Platelet counts were performed prior to surgery, preinfusion, and 2 and 4 hr postinfusion. There was a marked fall in the platelet count in all groups 2 and 4 hr after pancreatic duct infusion; the salicylates and dipyridamole had no effect on the platelet response and there was no correlation between platelet response and the degree of pancreatitis produced by infusion. None of the 3 agents had any beneficial effect on the subsequent pancreatitis; on the contrary, aspirin appeared to aggravate the degree of pancreatitis.

2423 CHRONIC PANCREATITIS. (Rev.) (E.) Strum, W. B. (Yale U. Sch. Med., New Haven, Conn.) and H. M. Spiro. *Ann. Intern. Med.* 74(2):264-277, 1971.

2424 THORACIC DUCT LYMPH IN ACUTE PANCREATITIS. (Rus.) Kochnev, O. S. (Kazan Med. Inst., USSR) and F. Sh. Sharafislamov. *Biull. Eksp. Biol. Med.* 71(3):31-33, 1971.

See also numbers: 2395, 2408, 2416, 2615, 2618

2425 LIPID COMPOSITION OF HUMAN LIVER BIOPSY SPECIMENS. (E.) Laurell, S. (Univ. Hosp., Lund, Sweden) and A. Lundquist. *Acta Med. Scand.* 189(1-2):65-68, 1971.

Liver biopsies were performed on 38 patients including normals (3), those with obesity (7), maturity-onset diabetes mellitus (2), alcoholics after abstinence of 4-60 days (13), psoriasis (6), porphyria cutanea tarda (3), and fatty liver without any other demonstrable disease (4). Total lipids were measured as g/100 g of dry liver and results were reported for triglycerides, cholesterol esters, free cholesterol and phospholipids. There was no systematic variation in the relative amounts of different lipids with the basic diseases but there was a significant correlation (r= 0.88) between cholesterol esters and triglycerides for subjects with triglycorides less than 25 g/100 g liver, but not for those with triglycoride levels greater than this; the correlation between cholesterol esters and free cholesterol was 0.67 and 0.76 resp., in these 2 groups. For the lower triglyceride level, the multiple correlation coefficient for the relation between cholesterol esters, free cholesterol and triglycerides was as high as 0.91. The phospholipid level varied inversely (r= -0.64) with that of triglycorides, but this correlation disappeared when phospholipids were expressed as g/100 g of triglyceride-free liver. It is suggested that there may be some association between levels of cholesterol esters and the surface area of fat droplets in the liver.

2426 THE EFFECT OF ALTERED THYROID FUNCTION OF THE ULTRASTRUCTURE OF THE HUMAN LIVER. (E.) Klion, F. M. (Mt. Sinai Sch. Med., New York, N. Y.), R. Segal and F. Schaffner. *Am. J. Med.* 50(3):317-324, 1971.

Liver biopsy specimens from 7 patients with hyperthyroidism and 2 patients with hypothyroidism (for comparison) were examined by light and electron microscopy to determine the ultrastructural features, their specificity, and to correlate the ultrastructural changes and clinical features with changes in hepatic function. The mitochondria of the hyperthyroid patients were enlarged, and megamitochondria occurred frequently. The smooth endoplasmic reticulum was hypertrophic, and glycogen was decreased. These changes appeared to be adaptive and were not reflected in abnormalities of hepatic function. It could not be determined whether the observed changes were caused by thyroxine or were secondary to metabolic alterations of the hyperthyroid state.

2427 TISSUE CULTURE OF ADULT HUMAN LIVER. (E.) Demoise, C. F. (Georgia Mental Health Inst., Atlanta), J. T. Galambos and A. Falek. *Gastroenterology* 60(3):390-399, 1971.

Adult human liver cultures were started from portions of needle aspirations obtained for biopsy. The first sign of culture survival was the appearance of new cells around the periphery of the explant. In general, cells had prominant, oval-shaped vesicular nuclei containing one or more nucleoli and their cytoplasm may or may not have contained granules and fenestrations. Many cells examined by electron microscopy suggested a mesenchymal rather than a parenchymal origin. Localized areas of cytopathic change were observed in a few cultures with phase contrast microscopy, the first sign of this change being marked by a dense accumulation of granules in the cell cytoplasm which later took on a honeycombed appearance followed by eventual cellular degeneration and granular inclusion release. Twenty-four of 28 liver specimens survived in culture. Cultures from livers with alcoholic hepatitis had greater growth and survival rates than those from normal and alcoholic fatty livers. The use of cells cultured from adult human liver in virus studies is suggested.

2428 HEPATIC ULTRASTRUCTURE IN MUCOLIPIDOSIS I (LIPOMUCOPOLYSACCHARIDOSIS). (E.) Freitag, F. (U. Kiel Dept. Pathol., Germany), S. Blümcke and J. Spranger. *Virchows Arch. [Zellpathol.]* 7(2/3):189-204, 1971.

Electron microscopic examination of liver biopsy specimens from 2 children with mucolipidosis 1 (lipomucopolysaccharidosis) were performed. Hepatocytes showed membrane-delineated storage vacuoles with evenly distributed reticulogranular structures, opaque globules, tubular structures, lamellar figures and/or vesicles. Lysosomes with islets of storage material were also seen. Kupffer cells were greatly enlarged and showed tightly packed storage vacuoles. Sinusoids contained various storage elements, enlarged Kupffer cells and cellular debris. Fibroblast-like cells of portal triads and perisinusoidal spaces also evidenced storage vacuoles. From the above evidence it is hypothesized that storage vacuoles originate from lysosomes.

2429 CLOTTING ABNORMALITIES FOLLOWING ORTHOTOPIC AND HETEROTOPIC TRANSPLANTATION OF MARGINALLY PRESERVED PIG LIVERS. (E.) Homatas, J., S. Wasantapruek, E. von Kaulla, K. N. von Kaulla (U. Colorado Sch. Med., Denver) and B. Eiseman. *Acta Hepatosplenol. (Stuttg.)* 18(1):14-27, 1971.

Clotting abnormalities included a decrease of platelets and fibrinogen due to trapping within the poorly preserved pig liver. There was also an increased fibrinolytic activity, only in the orthotopically transplanted livers, which together with the above decreases, suggested an underlying consumption coagulopathy. A decrease of antihemophilic globulin and release of a heparin-like substance from the liver several hours after transplantation were also observed. The differential between the euglobulin lysis time of animals receiving orthotopic preserved livers (progressively shortened) and those receiving auxiliary preserved organs (normal) suggests the necessity of liver function for maintainence of the fibrinolytic equilibrium in the blood.

2430 THE USE OF HYDRON IN RESECTION OF THE LIVER. (E.) Michněvič, I. (Charles U. 2nd Surg. Clin., Prague, Czechoslovakia) and K. Kliment. *J. Biomed. Mater. Res.* 5(1):17-24, 1971.

Since the tenderness of the hepatic parenchyma allows suture to cut through easily, the hydrophilic gel Hydron reinforced with polyester netting (to serve as bolsters for anchoring the sutures and prevent cutting through the parenchyma) was tested as a covering for the raw wound surface of resected livers in rabbits. Hydron was also used to aid the peritonealization process of the resection-wound surface of the liver. The Hydron bolsters seemed to be clinically utilizable in selected liver surgeries; however, the Hydron sponge foil is not recommended for recovering the raw surface of the resected liver due to the hazard of necrosis of the intestinal wall or of another hollow organ.

2431 USE OF THE LEFT RENAL VEIN FOR PORTAL DECOMPRESSION. (E.) Baird, R. J. (Toronto Western Hosp., Ontario, Canada), H. Tutassaura and R. T. Miyagishima. *Ann. Surg.* 173(4):551-553, 1971.

Experiences involving use of the left renal vein for portal decompression in 12 patients with portal hypertension (secondary to intrahepatic obstruction and/or portal vein obstruction) are discussed and the resulting benefits explained. The availability of the divided left renal vein increases its suitability for superior meso-renal, inferior meso-renal and spleno-renal shunts. The superior mesenteric vein to left renal shunt can be performed without fear of congestive venous symptoms in the legs which may follow the standard Clatworthy meso-caval shunt. The availability of the renal vein also allows the superior mesenteric vein to be decompressed without a prosthesis or a venous homograft. The divided left renal vein allows a peripheral shunt to be performed with great ease, decreasing the incidence of encephalopathy, and would appear to be a reasonable alternative to the standard spleno-renal or meso-caval shunt.

2432 ORTHOTOPIC LIVER TRANSPLANTATION FOR WILSON'S DISEASE. (E.) DuBois, R. S., D. O. Rodgerson, G. Martineau, G. Shroter, G. Giles, J. Lilly, C. G. Halgrimson, T. E. Starzl, (Denver VA Hosp., Colo.), I. Sternlieb and I. H. Scheinberg. *Lancet* 1(7698):505-508, 1971.

The diagnosis of Wilson's disease in an 11 year old Caucasian male was established from the high copper concentration in the liver as well as the presence of Mallory bodies. The patient was treated successfully by total host hepatectomy and orthotopic homotransplantation of a cadaver liver. At 18 months following transplantation the total body copper declined steadily, while the copper concentration in the new liver remained normal. If the essential defect in Wilson's disease were hepatic, provision of a new liver would be expected to be curative, since liver homografts and the proteins they synthesize retain their donor specificity in the new host for a long time. Therefore, since the above patient had no postoperative evidence of Wilson's disease, it is suggested that this disease is a liver-based inborn error of metabolism.

2433 FAMILIAL HEPATOMA WITH HEPATITIS-ASSOCIATED ANTIGEN. (E.) Denison, E. K. (John Wesley County Hosp., Los Angeles, Calif.), R. L. Peters and T. B. Reynolds. *Ann. Intern. Med.* 74(3):391-394, 1971.

Two brothers died of primary hepatocellular carcinoma. They both had macronodular cirrhosis and the hepatitis associated antigen was present in the serum of one of these brothers. The other's serum was not tested for this agent. The father of these 2 men died of carcinoma of the liver, but no details of his terminal illness were available. In one patient chronic infection by the hepatitis virus led to macronodular cirrhosis and this in turn led to the development of hepatocellular carcinoma. The fact that a sibling also had macronodular cirrhosis with areas of focal necrosis and hepatocellular carcinoma, would suggest a similar cause. Impaired immunity of genetic origin may have been the underlying factor in the disease of these 3 family members.

2434 HEPATIC COMA SECONDARY TO METASTATIC LIVER DISEASE. (E.) Eras, P. (Mem. Hosp. Cancer Allied Dis., New York, N. Y.) and P. Sherlock. *Ann. Intern. Med.* 74(4):581-583, 1971.

In 292 patients with metastatic liver disease, 21 (7.2%) developed hepatic coma. These 21 patients included 15 of 199 (7.5%) with breast carcinoma, 4 of 63 (6.4%) with colon carcinoma, and 2 of 30 (6.6%) with stomach carcinoma. In 11 of the 21 patients, hepatic coma was not considered clinically; in most of these patients, jaundice had been present for more than 1 month. Early recognition of this syndrome may result in prolonged survival by the rapid institution of a hepatic coma regimen and avoidance of narcotics and other hepatotoxic drugs which may aggravate the hepatic coma. Radiotherapy to the liver should also be avoided at least until the coma is controlled.

2435 PREVENTION OF OROTIC ACID-INDUCED FATTY LIVER WITH ALLOPURINOL. (E.) Windmueller, H. G. (Natl. Inst. Arthritis Metabol. Dis., Bethesda, Md.) and L. H. von Euler. *Proc. Soc. Exp. Biol. Med.* 136(1):98-101, 1971.

Allopurinol (0.05% in the diet) completely prevented the accumulation of liver fat and the weight gain depression produced by 1% orotic acid in Sprague-Dawley rats. The addition of allopurinol to a diet containing 1% orotic acid effectively prevented the large concentration changes in adenosine (decrease) as well as uridine (increase) nucleotides produced by orotic acid alone. A previously proposed biochemical link between the altered nucleotide levels and the block in hepatic lipid transport produced by orotic acid was supported. The known effects of allopurinol on purine metabolism and on pyrimidine nucleotide biosynthesis, or both, may explain the protective action against orotic acid fatty liver.

2436 BUDD-CHIARI SYNDROME IN WOMEN TAKING ORAL CONTRACEPTIVES. (E.) Hoyumpa, A. M., Jr., L. Schiff (U. Miami Sch. Med., Fla.) and E. L. Helfman. *Am. J. Med.* 50(1):137-140, 1971.

The cases of two women taking oral contraceptives who developed the Budd-Chiari syndrome are presented. In both cases, the women presented with abdominal pain, an enlarged liver and ascites. In one case a liver biopsy specimen revealed profound congestion with marked distention of the sinusoids and attenuation of liver cell plates. Withdrawal of the contraceptives and administration of hydrochlorothiazide led to her recovery. On laparotomy, a wedge biopsy of the second patient's liver revealed changes consistent with the Budd-Chiari syndrome. The ascites became refractory to medical treatment and she died of bleeding varices one year after the onset of symptoms. At autopsy, thrombic occlusions of hepatic veins, the mesenteric veins, portal vein, splenic vein and splenic artery were found.

2437 MONOCROTALINE-INDUCED BUDD-CHIARI SYNDROME IN MONKEYS. (E.) Allen, J. R. (U. Wisconsin Med. Sch., Madison) and L. A. Carstens. *Am. J. Dig. Dis.* 16(2):111-121, 1971.

Monocrotaline, a pyrrolizidine alkaloid, was administered s.c. to 10 adult *Macaca speciosa* monkeys for 6 months and blood counts, total serum protein, serum electrophoretic patterns, serum bilirubin and SGOT levels were determined weekly. Serum albumin decreased from approximately 50% to less than 30% by the end of the experiment. The change in the globulin fraction of serum protein was related to an increase in β- and γ-globulin. After injection of monocrotaline, SGOT levels frequently exceeded 300 units, decreased to less than 100 units within the succeeding week, and subsequently maintained a level between 75 and 100 units. Porta/venous pressures were increased in all treated animals. Monocrotaline produced alterations in the entire hepatic venous system, the more severe, acute lesions being present in the centrilobular and sublobular hepatic veins. The initial alterations were associated with separation of contiguous endothelial cells and with swelling and lysis of the endothelium. After alterations in permeability, blood plasma and cells accumulated in the subendothelial area, thus producing additional disruption. The alterations in the vessel wall became progressively more severe, eventually leading to partial or complete luminal obliteration. During the separative stage, an infiltration of fibroblasts occurred and the area was gradually replaced by fibrous connective tissue. This experimental model may be employed to study the Budd-Chiari syndrome.

2438 STUDY OF SERUM UROCANASE IN LIVER DISEASES. (E.) Abramov, A. (Municipal Govt. Med. Ctr., Tel Aviv, Israel), E. Neufeld and R. Chayen. *Isr. J. Med. Sci.* 7(2):264-267, 1971.

Urocanase activity was uniformly low in patients with cirrhosis, obstructive jaundice due to extrahepatic occlusion, or cholestatic jaundice due to chlorpromazine. On the other hand, patients with hepatocellular jaundice generally had elevated serum urocanase values. No rise in activity of serum urocanase was observed on raising the incubation temperature from 37-46°C, in contrast to a 40% increase in activity of the rat liver enzyme. Storage of sera at room temperature resulted in variable decreases in urocanase activity. The overlap in values of urocanase activity in obstructive and hepatocellular jaundice was appreciably smaller than that found in estimations of glutamate-oxaloacetate aminotransferase activity, hence serum urocanase may be the enzyme of choice in assessing liver damage.

2439 THE VARIED MANIFESTATIONS OF WILSON'S DISEASE. (E.) Slovis, T. L., R. S. Dubois (U. Colorado Med.,Ctr., Denver), D. O. Rodgerson and A. Silverman. *J. Pediatr.* 78(4): 578-584, 1971.

Examination of 11 patients with Wilson's disease illustrates the variability of presenting signs and symptoms. There may be presentation with a predominance of hepatic involvement, neurologic impairment or even severe hemolytic crises. Despite the variability, at least 50% of patients with Wilson's disease initially present with a manifestation of either acute or chronic liver disease. Neurologic manifestations: clumsiness, deteriorating school performance and tremors although awkwardness or dystonia are not in themselves diagnostic, and can cause considerable delay in establishing proper diagnosis. When present, Kayser-Fleischer rings are considered pathognomonic of Wilson's disease. In the abscence of these rings, diagnosis depends on laboratory testing, the most informative of which is a quantitative increase in hepatic copper. The treatment of Wilson's disease with D-penicillamine, a well-established and accepted form of therapy, was generally well tolerated in the present study except for the development of eukopenia in one patient and glossitis, rash, fever and lymphadenopathy in another.

2440 COPPER KINETICS IN LIVER DISEASE. (E.) Smallwood, R. A. (Roy. Free Hosp., London), B. McIlveen, V. M. Rosenoer and S. Sherlock. *Gut* 12(2):139-144, 1971.

Experimental subjects consisted of 4 patients with Wilson's disease (hepatolenticular degeneration) and 4 patients with primary biliary cirrhosis, while controls consisted of 3 patients with hepatocellular disease and 3 normals. The patients with Wilson's disease had been on penicillamine therapy (0.9-1.2 g/day) for 4-8 years and this was temporarily stopped 48-72 hours before each study. Subjects received a single .v. injection of 14.5-34.0 µg of $^{64}CuCl_2$ containing 100 µC of ^{64}Cu. The liver copper levels were elevated in those patients with primary biliary cirrhosis (367-714 µg/g dry liver) compared to normal or near-normal levels seen in those with hepatocellular disease (43-70 µg/g dry liver); of those with Wilson's disease, 1 had a level of 250 µg/g dry liver (no levels were obtained in the other 3). Plasma 'free' copper concentrations were within the normal range (5-10 µg/100 ml) in the patients with Wilson's disease and in the 2 control groups, but were significantly elevated (5-99 µg/100 ml with a median of 38 µg/100 ml) in 3 of 4 with primary biliary cirrhosis. The times for disappearance of 90% of injected label in Wilson's disease, primary biliary cirrhosis, hepatocellular disease and in normals were 49.3, 22.5, 21.0 and 22.0 min, respectively. Very little of the inected label was excreted in the urine in the first 6 hours, and the elevated level in those with Wilson's disease did not differ significantly from the others. By scintillation counting, those with primary biliary cirrhosis showed a rapid initial uptake of label, reaching a plateau until 12 hours and then dropping to 90% of the maximal level by 30 hours; a similar pattern occurred in the 2 control groups. In those with Wilson's disease, the uptake was more gradual and liver label continued to rise throughout the 30 hours without ever plateauing.

2441 SERUM BILE ACIDS IN LIVER DISEASE. (E.) Neale, G. (Roy. Postgrad. Med. Sch., London), B. Lewis, V. Weaver and D. Panveliwalla. *Gut* 12(2):145-152, 1971.

Subjects consisted of 9 patients with hepatitis, 1 with Weil's disease, 15 with obstructive jaundice (due to extrahepatic obstruction in 9 and to intrahepatic cholestasis in 6), 7 with cirrhosis (of whom 4 were alcoholics), 4 with ulcerative colitis or Crohn's disease associated with liver disease and 3 with idiopathic indirect hyperbilirubinemia (Gilbert's syndrome). Except in those with Gilbert's syndrome, there were elevations of serum bile acid concentrations up to 100 times normal. There was a statistically significant correlation of total serum bile acids with serum bilirubin, but not with serum cholesterol or serum enzymes. There was no clear-cut correlation between total serum bile acid levels and the presence (levels ranged from 15.4-285, with a mean of 126 µmole/l) or absence (2.7-225, mean 39.4 µmole/l) of pruritus; pruritis occurred in 12 of 15 with levels greater than 50 µmole/l and in only 3 of 15 with levels below this. In all groups, most of the circulating bile acids were conjugated. The glycine/taurine conjugation ratio was low in the serum bile acids of those with liver disease of short duration; the mean ratio was lowest in those with cholestasis and highest in those with cirrhosis. A markedly low ratio was more common in those with pruritus. The tri-/dihydroxy bile acid ratio was decreased in the serum of those with cirrhosis and this group also showed a negative correlation between the ratio of trihydroxy bile acids and the total serum bile acids. In 3 patients who received cholestyramine to reduce pruritus, there was a 30-40% reduction in total serum bile acids but no change in serum bilirubin or in level of cholesterol; there was some symptomatic relief.

2442 RENAL TUBULAR ACIDOSIS AND AUTOIMMUNE LIVER DISEASE. (E.) Golding, P. L. (King's Coll. Hosp., London) and A. S. M. Mason. *Gut* 12(2):153-157, 1971.

A group of 42 patients with autoimmune liver disease were examined to determine the frequency with which renal tubular acidosis occurs in this syndrome. Renal tubular acidosis either of the overt or incomplete variety was present in 16 patients (38%). An overt acidosis was present in 6 patients (14%). All 6 of those patients had hyperchloremic acidosis, and 3 had hypokalemia. Regarding the type of liver disease involved, 9 of the 15 patients with primary biliary cirrhosis, 6 of the 20 patients with active chronic hepatitis and 1 of the 7 patients with cryptogenic cirrhosis exhibited renal tubular acidosis. There was no significant difference in the concentration of either plasma potassium, copper, or total globulin between those patients with and those without renal tubular acidosis. The presence of renal tubular acidosis was not related either to the levels or class of immunoglobin elevated in the serum.

2443 CHANGES IN SERUM POTASSIUM AND pH DURING CLINICAL AND EXPERIMENTAL LIVER TRANSPLANTATION. (E.) Abouna, G. M. (Med. College Virginia, Richmond), J. A. Aldrete and T. E. Starzl. *Surgery* 69(3):419-426, 1971.

Clinical subjects consisted of 12 humans (0.5 to 48 yr. of age) undergoing orthotopic hepatic transplantation; in addition, 16 pigs underwent liver transplantation. In the clinical group the operative procedure lasted 6-14 hr. Good immediate homograft function was seen immediately after surgery in all but 1 patient, and 4 patients were still alive at time of report. During the anhepatic surgical phase there were no marked changes in blood pH or serum K^+. Following homograft revascularization, there was a significant and consistent drop in serum K^+ during the first 2 hr in all 11 patients receiving well-functioning homografts; this level usually normalized following i.v. administration of 10-40 mg K^+ and remained so during the immediate postoperative period. Most cases exhibited a fall in blood pH after revascularization despite prior administration of $NaHCO_3$. The pH was brought up to normal with additional $NaHCO_3$, leading to alkalosis in some cases. In one group of 10 pigs with good initial homograft function, serum K^+ fell as in humans and remained low in the immediate postoperative period in the absence of exogenous K^+; the significant fall of arterial pH within 15 min after revascularization responded quickly to 10-20 mEq bicarbonate. In the remaining 6 pigs with poor homograft function (all of whom died within a few hr.), the level of K^+ failed to fall; instead, it began to rise 30 min. after revascularization; this was accompanied by severe acidosis which failed to respond to large doses of bicarbonate. Neither humans nor pigs showed any consistent changes in serum levels of Na^+ or Cl^-.

2444 BODY-DISTRIBUTION OF AMMONIUM-NITROGEN IN LIVER FAILURE. (E.) Keynes, W. M. (Radcliffe Infirm., Oxford, England). *Ann. Surg.* 173(4):604-612, 1971.

In dogs, the ammonium-nitrogen level in normal muscle was found to be greater than in whole blood, thoracic duct lymph or cerebrospinal fluid while normal brain, pancreas and liver values were even more elevated. Five hours after the production of hepatic ischemia following portacaval shunt and ligation of the hepatic artery in dogs with rising blood ammonia levels, these levels in muscle, pancreas and brain increased to twice the concentrations measured in normal dogs. Examination of tissue samples revealed ammonia in brain to be mainly tissue bound, in contrast to the ammonium in pancreas and liver of which little is bound.

2445 PERIPHERAL NERVE FUNCTION IN CHRONIC LIVER DISEASE. (E.) Seneviratne, K. N. (U. Ceylon Dept. Physiol. Med., Colombo) and O. A. Peiris. *J. Neurol. Neurosurg. Psychiatry* 33(5):609-614, 1970.

Of 50 patients with chronic liver disease, 34 had evidence of a peripheral sensory nerve (median nerve) conduction defect (decreased response amplitude), while 10 of 50 had increased distal motor latencies. Evoked sensory nerve potentials are apparently a more sensitive index of a mixed peripheral nerve lesion than are the corresponding distal motor latencies. There was a striking disparity between the electro-diagnostic evidence of nerve damage seen in these 34 subjects and the clinically detectable evidence of a neuropathy which was seen in only 4 of this group. The absence of any significant differences in any of the parameters of nerve function between subjects in the alcoholic and nonalcoholic groups serves to exclude alcohol as the causative factor of the nerve damage in subjects with chronic liver disease. The resistance of the nerve to ischemia may be due to the existence of a relatively impermeable periaxonal diffusion barrier in the normal nerve which serves to limit the ion exchange rate between axon and extracellular fluid. Under ischemic conditions, inactivation of the membrane energy synthesis mechanisms would lead to an efflux of K from the axon.

2446 ALTERED COMPOSITION OF BILIRUBIN CONJUGATES IN RAT BILE AFTER OBSTRUCTION OF THE COMMON BILE DUCT. (E.) Van Damme, B. (St. Rafael Acad. Hosp., Louvain, Belgium), J. Fevery and K. P. M. Heirwegh. *Experientia* 27(1):27-28, 1971.

The biliary excretion of those bile pigments which on azo coupling yield the azopigments β and γ was stimulated in rats by mechanical or hydrostatic obstruction. Short-term obstruction (15-21 hr) caused a pronounced increase in the percentages of the (β&γ) azopigment fraction from 6.0±1.1% to 35.1±5.7% of total azopigment color immediately after removing the obstruction. Azopigment composition then gradually returned to pre-obstruction values. In rats obstructed for 2 or 4 days, the immediate post-obstruction values of the (β&γ) fraction amounted to 28.9±3.1% and 28.5-29.6%, respectively. Return to normal occurred at a slightly slower rate than in the shorter-term obstruction experiments.

2447 EXTREME HYPERBILIRUBININEMIA. (E.) Fulop, M. (Bronx Municipal Hosp. Ctr., N. Y.), S. Katz and C. Lawrence. *Arch. Intern. Med.* 127(2):254-258, 1971.

Of 19 patients with extreme hyperbilirubinemia (plasma bilirubin >30 mg/100 ml), 11 had alcoholic-nutritional cirrhosis with accompanying renal failure and 8 had acute viral hepatitis. Of those patients with hepatitis, 4 had excessive hemolysis (3 with glucose-6-phosphate dehydrogenase deficiency and 1 with sickle cell anemia), while the other 4 had no obvious explanation for the intense hyperbilirubinemia. Impaired renal function and excessive hemolysis can contribute to the occurrence of unusually severe jaundice in patients with hepatobiliary disease. With extrahepatic biliary obstruction, the plasma bilirubin seldom exceeds 25-30 mg/100 ml.

2448 LABELED BILIRUBIN PRODUCTION BY A CLONAL STRAIN OF RAT HEPATOMA CELLS. (E.) Robinson, S. H. (Beth Israel Hosp., Boston, Mass.), H. E. Rugstad, C. Yannoni and A. H. Tashjian, Jr. *Proc. Soc. Exp. Biol. Med.* 136(3):684-686, 1971.

Cells of a clonal strain (MH$_1$C$_1$) of rat hepatoma cells were incubated in vitro with either glycine-2-^{14}C (18 mC/mmole) or δ-aminolevulinic acid-3,5-^{3}H (455 mC/mmole). Labelled bilirubin was crystallized from the medium after addition of rat bile containing a measured amount of nonlabelled bilirubin. MH$_1$C$_1$ cells incorporated an average of 0.013% of the glycine substrate into bilirubin-^{14}C/mg of cell protein. In cells preincubated for 5 days with 0.2 mg/ml phenobarbital, there was no increase in cell protein but there was a consistent small rise in production of labeled bilirubin. Low levels of bilirubin were obtained from the medium exposed to fibroblasts. The incorporation of δ-aminolevulinic acid was 70 times that of glycine. There was a slight but inconsistent increase when cells were preincubated with phenobarbital. The production of labelled bilirubin from this precursor by fibroblasts was almost as effective as by the MH$_1$C$_1$ cells. In MH$_1$C$_1$ cells not preincubated with phenobarbital, the absolute rate of bilirubin production was 0.03 and 0.04 mμmole of bilirubin/day/mg of cell protein with glycine and δ-aminolevulinic acid, resp.; the calculated corresponding value for rat liver in situ was 0.17-0.26 mμmole/day/mg.

2449 SULFOBROMOPHTHALEIN TOLERANCE TEST IN PATIENTS WITH DUBIN-JOHNSON SYNDROME AND THEIR RELATIVES. (E.) Shani, M. (Tel Hashomer Govt. Hosp., Tel Aviv, Israel), E. Gilon, J. Ben-Ezzer and C. Sheba. *Gastroenterology* 59(6):842-847, 1971.

Subjects consisted of 13 patients without liver diseases, 13 patients with various hepatic disorders (either primarily hepatocellular disease or extrahepatic obstruction), 15 patients with Dubin-Johnson syndrome, 17 close relatives of Dubin-Johnson patients and the parents of 2 sibs with Rotor syndrome. By constant infusion of BSP at different rates, the transport maximum and the relative storage capacity of this dye in the hepatic parenchyma were calculated. Compared to controls, patients with hepatic disorders showed reduction of both these parameters. In the Dubin-Johnson patients, the transport maximum approached zero while the relative storage capacity for BSP was entirely normal. In relatives of Dubin-Johnson and Rotor patients, both parameters were always within normal limits, suggesting an autosomal recessive inheritance pattern in the case of Dubin-Johnson syndrome.

2450 SPLENIC BLOOD FLOW IN IDIOPATHIC PORTAL HYPERTENSION IN JAPAN MEASURED BY ^{85}Kr CLEARANCE METHOD. (E.) Ueda, H. (U. Tokyo Hosp.), K. Kitani, H. Kameda, T. Takeda, K. Chiba, M. Nagatani, H. Yamada and M. Iio. *Acta Hepatosplenol. (Stuttg.)* 18(1):28-40, 1971.

Splenic blood flow (SBF) was determined in 24 patients with idiopathic portal hypertension or other disorders with portal hypertension or splenomegaly and 5 normal controls by the ^{85}Kr clearance method. In the control subjects the average splenic flow per 100 g tissue weight (SBF 100g) was 118.6±29.1 ml/min and total splenic flow (SBF$_t$) was 145.8±86.7 ml/min. Although the SBF 100 mg was unaffected by idiopathic portal hypertension, the SBF$_t$ increased significantly (537.3±362.4 ml/min). Eight patients with liver cirrhosis without splenomegaly exhibited reduced SPF$_{100g}$ (64.2±14.2 ml/min) while the SBF$_t$ approximated the normal value. The SBF$_{100g}$ was higher in liver cirrhosis with splenomegaly, extrahepatic portal obstruction and Wilson's disease than it was in ordinary liver cirrhosis. Total splenic flow increased directly with size of the spleen.

2451 AMILORIDE (MK-870), A NEW ANTIKALURETIC DIURETIC. COMPARISON TO OTHER ANTIKALURETIC DIURETICS IN PATIENTS WITH LIVER DISEASE AND ASCITES. (E.) Yamada, S. and T. B. Reynolds (U. Southern California Sch. Med., Los Angeles). *Gastroenterology* 59(6):833-841, 1971.

A group of 72 patients with ascites due to liver disease consisted of 68 with alcoholic liver disease, 3 with cryptogenic cirrhosis and 1 with carcinoma metastasizing to the liver. All had refractory ascites, baseline urinary sodium values less than 10 mEq/24 hr and were on a 20 mEq/day salt diet. In 43 who received amiloride (MK-870) in a dose of 20 mg/day, natriuresis was considered excellent (greater than 50 mEq/day) in 18, moderate (25-50 mEq/day) in 18 and poor (less than 24 mEq/day) in 7. Kaluresis was minimal and increased more than 10 mEq above baseline in only 8 patients. Increased natriuresis was seen in 6 of 7 who received 100 mg hydrochlorthiazide twice daily. In 30 patients receiving amiloride, urinary pH increased in 23 and decreased in 1, while urinary bicarbonate excretion decreased in 11 and remained unchanged in 19. Out of 50 patients, diuresis was marked (more than 0.5 kg/day weight loss) in 25, moderate (less than 0.5 kg/day) in 15 and unsatisfactory in 10. Of these 50, 40 showed no electrolyte abnormalities, 4 showed some azotemia, 4 developed mild or moderate acidosis and 8 developed hyperkalemia (greater than 6.0 mEq/liter). A combination of amiloride (20-30 mg/day) and hydrochlorthiazide (100 mg twice daily) was given to 26 patients while amiloride (20-30 mg/day) and ethacrynic acid (100 or 200 mg/day) was given to 30 patients; moderate or marked diuresis was seen in all but 4, all on the first regimen. In combination with ethacrynic acid, amiloride (20 mg/day) was more effective than triamterene (300 mg/day) or spironolactone (100 mg/day) when each agent was used in combination with ethacrynic acid.

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2489 WEIL'S DISEASE. (Ger.) Chmelik, V. *Zentralbl. Allg. Pathol.* 113(4):470, 1970.

See also numbers: 1966, 1975, 1986, 2106, 2107, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2181, 2203, 2204, 2518, 2619, 2696, 2699

ACUTE NONVIRAL HEPATITIS AND HEPATIC INJURY

2490 EFFECTS OF GLUCOSE ON THE BIOCHEMICAL CHANGES IN RAT LIVER IN ACUTE ETHIONINE INTOXICATION. (E.) Raick, A. N. (U. Toronto Banting Inst., Ontario, Canada), A. S. Narayanan and A. C. Ritchie. *Exp. Molec. Pathol.* 14(2): 176-183, 1971.

Glucose fed to female rats 6 hours after a dose of ethionine reversed the inhibition of RNA and protein synthesis induced in the liver by the ethionine, the effect on protein synthesis being slower and less complete. The level of ATP in the liver or the rate of ATP turnover were not altered significantly by glucose. The above results are apparently in conflict with the hypothesis that ATP deficiency is the basis of the changes induced by acute intoxication with ethionine. It is possible that the increase in RNA and protein synthesis caused by glucose is related to its stimulation of insulin release.

2491 FURTHER OBSERVATIONS UPON THE EFFECTS OF PHENOBARBITAL PRETREATMENT ON THE HEPATOTOXICITY OF CARBON TETRACHLORIDE. (E.) Stenger, R. J. (New York Med. Coll., N. Y.) and E. A. Johnson. *Exp. Molec. Pathol.* 14(2):220-227, 1971.

One day following a treatment course of phenobarbital (4 injections per day) treated rats slept for significantly shorter times and showed increased hepatocellular smooth endoplasmic reticulum, particularly in centrilobular and midzonal parenchymal cells, when compared to their saline counterparts. At eight days following drug treatment sleep patterns were comparable to normals but hepatic smooth muscle endoplasmic reticulum remained the same. When challenged with carbon tetrachloride at 1 day after their last pretreatment, phenobarbital injected rats suffered a 77% mortality, the livers showing massive or submassive necrosis, whereas there were no deaths among the saline pretreated controls. When the toxic challenge was delayed until the eighth day after the last pretreatment, the phenobarbital treated animals showed only a limited centrilobular zone of injury and no deaths. Since the smooth endoplasmic reticulum membranes were similar at both time intervals, the proliferation of these membranes per se probably cannot be responsible for the observed differences in carbon tetrachloride hepatotoxicity. However, the hepatic drug metabolizing enzyme systems may be directly involved in precipitating the damaging effects of this poison upon rat liver.

2492 LASIOCARPINE: FACTORS INFLUENCING ITS TOXICITY AND EFFECTS ON LIVER CELL DIVISION. (E.) Rogers, A. E. (Massachusetts Inst. Technol., Dept. Nutr. Food Sci., Cambridge) and P. M. Newberne. *Toxicol. Appl. Pharmacol.* 18(2):356-366, 1971.

Two major aspects of the hepatotoxicity of lasiocarpine: the inhibition of cell division and the induction of necrosis of liver cells, were examined. The necrotizing action of lasiocarpine on the hepatocyte was markedly decreased in rats fed either lipotrope-deficient diets or given mercapto-ethylamine. The deficient diets lowered the level of certain drug metabolizing enzymes in the liver and may thereby have decreased conversion of lasiocarpine to toxic metabolite(s). Another possible protective mechanism, decreased absorption of the toxin from the intestinal tract, was probably not a factor since lipotrope deficiency did not significantly affect the inhibition of all division by lasiocarpine. Agents such as α-tocopherol and ubiquinone did not afford any protection against lasiocarpine. Lasiocarpine, shown to inhibit all liver DNA synthesis and mitosis following partial hepatectomy, inhibited neither the generalized hyperplasia induced by N-2-fluorenylacetamide (a carcinogen) nor the development of focal hyperplastic areas; nor did lasiocarpine inhibit the induction of hepatocarcinoma. Therefore, either the continued presence of the carcinogen was a stronger stimulus to all division than partial hepatectomy, or the

arcinogen was acting to induce cell division at
site not affected by lasiocarpine.

493 ON THE ANTICIRRHOTIC EFFECT OF CERTAIN
BIOLOGICALLY ACTIVE SHORT-CHAIN THIO-
MINO ACIDS. NOTE I. THE EFFECT OF THE PREPARA-
ION CONTAINING N-ACETYL-D,L-HOMOCYSTEINE THIOLAC-
ONE, L-CYSTEINE, AND D-FRUCTOSE. (E.) Maros,
. (Med. Pharmaceut. U., Tirgu-Mures, Rumania),
. Lakatos, L. Seres-Sturm, M. Fagarasanu, E.
alint and E. Poenaru. *Arzneim. Forsch.* 21(2):
57-261, 1971.

he hepatoprotective and collagenolytic effects
f preparation R (containing N-acetyl-D,L-homo-
ysteine thiolactone, L-cysteine and D-fructose)
ere studied in rats with chronic carbon tetra-
hloride (CCl_4) poisoning. R was admin. for 12
eeks in daily doses of 0.10 ml/100 g body weight,
as well tolerated and did not produce any histo-
ogically detectable liver lesions. The hepato-
rotective effect of R was primarily due to its
ntinecrotic properties; more attenuated and
ess extensive dystrophic cellular lesions, a
ess significant steatosis and a greater glycogen
nd RNA content in the livers of treated rats
ompared to controls (those given CCl_4 alone).
was also found to inhibit the reaction of
epatic mesenchyma to chronic CCl_4 poisoning by
arkedly reducing the fibrotic process. Related
the above finding, hydroxyproline content
reflection of collagen) was decreased in
reated rats. It seems apparent that R has both
ollagenolytic and anticirrhotic properties.

494 ALCOHOLIC HEPATITIS. NATURAL HISTORY
AND EVALUATION OF PREDNISOLONE THERAPY.
E.) Helman, R. A. (U. North Carolina Sch. Med.,
hapel Hill), M. H. Temko, S. W. Nye and H. J.
allon. *Ann. Intern. Med.* 74(3):311-321, 1971.

n 37 patients with acute alcoholic hepatitis
he major presenting symptoms were anorexia,
ausea, vomiting, weakness, and weight loss with
epatomegaly being the most common physical find-
ng. Clinically, patients varied from hepatic
oma to an asymptomatic condition. SGOT levels
ere elevated in all of the patients. Signifi-
antly lower albumin levels and more prolonged
rothrombin times were the only liver function
ests that were significantly different in the
ost seriously ill patients compared to mildly
ll subjects. The survival and mean daily
aloric intake were statistically greater in
everely ill patients and moderately ill patients
reated with prednisolone. The ineffectiveness
f prednisolone in changing the histological
eatures of healing alcoholic hepatitis was
bserved within each severity group. The develop-
ent of cirrhosis during the healing of alcoholic
epatitis was detected during the 4-month follow-
p in 5/9 patients in which initial biopsy
howed no cirrhosis.

2495 JAUNDICE AND ORAL CONTRACEPTIVES. (E.) Dooner, H. P. (U. Chile Dept. Med., Santiago), C. Hoyl, C. Aliaga and J. Parada. *Acta Hepatosplenol. (Stuttg.)* 18(2):84-94, 1971.

Seven cases of jaundice in premenopausal women taking oral contraceptives were presented, 2 cases being reported in detail because of special features. One of these 2 patients was jaundiced while receiving a combination of ethynyl estradiol plus norethisterone acetate but at the end of a 2-month period without drugs she was no longer jaundiced, only to become jaundiced again with resumption of oral contraceptive therapy. In the second patient, liver biopsy showed intrahepatic cholestasis, her jaundice being progressive and of the obstructive type. The 2 doses employed may explain the different types (hepatotoxic and cholestatic) of injury observed. Plasma alkaline phosphatase levels were normal, in contrast to results obtained in other forms of drug-induced jaundice, such as that caused by chlorpromazine. Oral contraceptives may, perhaps, cause a new and different type of liver injury.

2496 ALCOHOL AND THE LIVER. (E.) Brunt, P. W. (Aberdeen Gen. Hosps., Scotland). *Gut* 12(3):222-229, 1971.

2497 CHEMICAL AND ENZYMATIC COMPOSITION OF MICROSOMAL SUBFRACTIONS FROM RAT LIVER AFTER TREATMENT WITH PHENOBARBITAL AND 3-METHYLCHOLANTHRENE. (E.) Glaumann, H. (Karolinska Inst., Stockholm, Sweden). *Chem. Biol. Interactions* 2(4):369-380, 1970.

2498 A STUDY OF THE EFFECT OF A LONG ACTING PROGESTAGEN ESTROGEN INJECTABLE CONTRACEPTIVE ON THE LIVER FUNCTION. (E.) Sammour, M. B., (Ain Shams U. Fac. Med. Cairo, Egypt), W. N. Ibrahim and A. Shaker. *Ain Shams Med. J.* 21(5): 475-480, 1970.

2499 CITRIC ACID CONTENT IN VARIOUS ORGANS OF RAT AFTER FLUOROACETATE POISONING. (Rus.) Kirzon, M. V., (State U. Biol. Dept.) Moscow), V. N. Timeiko and V. A. Artiushkova. *Vopr. Med. Khim.* 16(5):543-549, 1970.

2500 PATHOGENESIS OF METHIONINE INDUCED TOXICITY. (E.) Hardwick, D. F., (U. British Columbia, Vancouver, Canada) D. A. Applegarth and D. M. Cockcroft. *Metabolism* 19(5):381-391, 1970.

2501 ESSENTUKI HEALTH RESORT TREATMENT OF PATIENTS SUFFERING FROM TOXIC CHEMICAL DISEASE OF THE LIVER. (Rus.) Konchalovskaia, N. M., A. S. Vishnevski and A. V. Khodikin. *Klin. Med. (Mosk.)* 48(3):65-69, 1970.

2502 STUDIES ON GLUCONEOGENESIS IN GALACTOSAMINE INDUCED HEPATITIS. (E.) Monier, D. (Indiana U. Sch. Med., Indianapolis) and S. R. Wagle. *Proc. Soc. Exp. Biol. Med.* 136(2): 377-380, 1971.

2503 HISTOPATHOLOGIC STUDIES ON THE EFFECT OF A SULFATED POLYANION ON CARBON TETRACHLORIDE INDUCED FATTY LIVER IN THE RAT. (Ger.) Papadimitriou, D., (U. Athens Inst. Pathol., Greece), D. Kannas and S. C. Bartsokas. *Med. Welt* 22(3):100-103, 1971.

2504 METHYL CHLOROFORM INTOXICATION. DIAGNOSIS AND TREATMENT. (E.) Stewart, R. D. (Med. Coll. Wisconsin, Milwaukee). *JAMA* 215(11):1789-1792, 1971.

2505 LUPOID HEPATITIS DUE TO A LAXATIVE, CXYPHENISATIN. (E.) Reynolds, T. B., (USC Sch. Med., Los Angeles, Calif), S. Yamada and R. L. Peters. *Clin. Res.* 19(1):176, 1971.

2506 HEPATOTOXICITY OF HALOTHANE METABOLITES IN VIVO AND INHIBITION OF FIBROBLAST GROWTH IN VITRO. (E.) Rosenberg, P. H. (U. Helsinki Dept. Pharmacol., Finland) and T. Wahlstrom. *Acta Pharmacol* 29(1):9-19, 1971.

2507 EXPERIMENTAL INVESTIGATIONS ON THE LIVER CELL TOXICITY OF TRIPARANOL. (Ger.) Otto, H. F. (U. Hamburg Inst. Pathol., Germany). *Beitr. Pathol. Anat.* 142(2):177-193, 1971.

2508 LIVER DAMAGE DUE TO METHOTREXATE IN PATIENTS WITH PSORIASIS. (E.) Dahl, M. G. C., (Roy. Victoria Infirm., Newcastle-on-Tyne, England) M. M. Gregory and P. J. Scheuer. *Br. Med. J.* 1(5750):625-630, 1971.

2509 ENDOCYTOSIS IN KUPFFER CELLS AFTER DAMAGE OF LIVER PARENCHYMA INDUCED BY 75% RESECTION OF RAT LIVER. (Ger.) Pfeifer, U. (U. Wurzburg Inst. Pathol., Germany). *Virchows Arch. [Zellpathol.]* 6(3):263-280, 1970.

2510 CELL PROLIFERATION AFTER TRAUMATIC INJURIES OF THE LIVER. (Ger.) Helpap, B. (U. Bonn Inst. Pathol., Germany) and H. Cremer. *Virchows Arch. [Zellpathol.]* 6(4):365-366, 1970.

See also numbers: 1971, 1974, 2150, 2427, 2436, 2457, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510

ACUTE VIRAL HEPATITIS

2511 INVOLUTION OF LIVER MITOCHONDRIA IN VIRAL HEPATITIS. (E.) Pavel, I. (Cantacuzino Hosp., Bucharest, Rumania), H. Bonaparte and A. Petrovici. *Arch. Pathol.* 91(4): 294-301, 1971.

Mitochondrial involution in the liver during 5 cases of viral hepatitis was observed using the electron microscope. The mitochondrion, which had lost its cristae and taken on an electron-dense reticular or granular aspect being taken up by preexisting lysosomes was the most constantly encountered form of involution. In some cases, mitochondria were transformed into microbodies. In one case the process of involution involved the "melting" of mitochondria into the vesicles or greatly distended cisternae of the endoplasmic reticulum. Involution of the mitochondria in the form of a fingerprint was encountered in one case. In another case, involution occurred by pigmentary degeneration or inhibition. Although these types of involution were not observed in cases of viral hepatitis with a normal evolution, alcholism, denutrition, or a prolonged evolution with relapses in the course of the disease appeared to condition these peculiar involution forms.

2512 HYPOSMIA IN ACUTE VIRAL HEPATITIS. (E.) Henkin, R. I. (Natl. Heart Lung Inst., Bethesda, Md.) and F. R. Smith. *Lancet* 1(7704): 823-826, 1971.

A group of 19 patients with acute viral hepatitis were found to have decreased olfactory activity (hyposmia) associated with dysgeusia and dysosmia (foods had an obnoxious taste and smell, resp.). Median olfactory detection and recognition threshholds for each patient were measured for 3 vapors; pyridine in water (acrid, unpleasant), nitrobenzene (bitter almond character) and thiophene (onion like) in mineral oil. The hyposmia (type II because of diminished as opposed to absence of responsiveness) of acute viral hepatitis improved as the illness subsided. There was a significant inverse relationship between olfactory detection acuity for pyridine and bilirubin and a direct correlation between return of detection acuity and the plasma-retinol-binding-protein level. It was postulated that if vitamin A has an influence on the quantitative olfactory end organ response in this disease process then it may be related to a function of the vitamin A alcohol transported by retinol-binding-protein. Measurement of olfactory acuity is an excellent diagnostic aid and index of improvement in acute viral hepatitis.

2513 RELEASE OF β-GLUCURONIDASE AS A QUANTITATIVE ASSAY OF MURINE VIRAL HEPATITIS INJURY IN CULTURED CELLS. (E.) Sabesin, S. M. (Jefferson Med. Coll., Philadelphia, Pa.), D. V. Datta and K. J. Isselbacher. *Exp. Molec. Pathol.* 14(2):200-211, 1971.

The injurious effects of viruses on susceptible hepatic cells in culture may be reflected not only in morphological alterations but also by the quantitative redistribution of a cellular enzyme (beta-glucuronidase) among the various components (cells, debris, and medium) of the culture system. In cultures injured by viral hepatitis there was an increase in the percentage of total β-glucuronidase activity in the medium fraction, the increase being derived from 2 sources: particulate enzyme in the cellular debris and β-glucuronidase released from damaged cells and present in a soluble form in the medium. A direct relationship was observed between increasing medium enzyme activity and severity of cytopathic effects. A cause and effect relationship between the release of lysosomal enzymes (β-glucuronidase) and viral cytopathic effects was not advocated, since a viral-mediated alteration in lysosomal and cell membrane permeability with resultant release of hydrolase into the infected fluids may be an early indication of cytopathic effects without reflecting a specific role of these enzymes in the etiology of viral induced cell injury.

2514 CIRRHOSIS ASSOCIATED WITH THE AUSTRALIA ANTIGEN IN AN INFANT WHO ACQUIRED HEPATITIS FROM HER MOTHER. (E.) Wright, R. (Nuffield Dept. Clin. Med., England), J. R. Perkins, B. D. Bower and D. W. Jerrome. *Br. Med. J.* 4(5737):719-721, 1970.

The case of a 19 month old infant who developed cirrhosis after contracting acute viral hepatitis from her mother is presented. A biopsy was performed 7 months after admission as the Australia (Au) antigen was detected repeatedly in the serum; liver and spleen increased in size. The biopsy was interpreted as indicating a chronic active hepatitis with cirrhosis and giant cell transformation. Liver function tests were also abnormal. Her mother who was jaundiced at the end of the pregnancy and for 1 month after delivery was shown to be a carrier of the Au antigen. Two subsequent serum specimens from the infant contained rounded and elongated particles with surface projections resembling corona or paramyxoviruses. Treatment with prednisolone (20 mg/day) yielded an improvement in liver function tests.

2515 VIRUS-LIKE PARTICLES ASSOCIATED WITH A FAECAL ANTIGEN FROM HEPATITIS PATIENTS AND WITH AUSTRALIA ANTIGEN. (E.) Cross, G. F. (Monash U. Dept. Microbiol., Prahvan, Victoria, Australia), M. Waugh, A. A. Ferris, I. D. Gust and J. Kaldor. *Aust. J. Exp. Biol. Med. Sci.* 49(1):1-9, 1971.

Two virus-like particles in fecal extracts from hepatitis patients have been shown by gel diffusion techniques to contain fecal antigen. One is 15-25 millimicrons and closely resembles the small particle associated with Australia antigen; the other is 40-45 millimicrons and resembles the large particle found in many Australia-antigen positive sera. Although morphologically similar to Australia antigen, they are serologically distinct. Tubular or rod-shaped particles, sometimes seen in Australia-antigen positive sera, were not observed in extracts containing fecal antigen. It is suggested that the small particles contain a type-specific and group specific antigens.

2516 HEPATITIS-ASSOCIATED ANTIGEN. QUALITATIVE AND QUANTITATIVE DETERMINATION. (E.) Skinhöj, P. (Bispebjerg Hosp., Copenhagen, Denmark) and H. Thulstrup. *Scand. J. Clin. Lab. Invest.* 27(1):61-66, 1971.

Sera from groups of hepatitis patients, renal transplant recipients, and normal individuals were examined for the presence of hepatitis-associated antigen (HAA) using agar-gel diffusion, gel-electrophoresis, and a micro-complement fixation technique. When the sensitivities of these 3 tests were estimated by titration experiments it was found that gel-electrophoresis was about 16-fold, and that complement-fixation method was about 500-fold, as sensitive as the double diffusion method. Accordingly, more patients with infectious hepatitis (42 of 66) and more blood donors (84 of 3574) were found to have the HAA when determined by complement fixation. Differences in the amount of HAA present in the serum samples investigated could also account for some of the differences.

2517 CLINICAL FEATURES OF SUBACUTE VIRAL HEPATITIS. (Pol.) Kozakiewicz, H. (Med. Acad. Infect. Dis. Clin., Gdansk, Poland), W. Zielińska, M. Jasiel and I. Billewicz. *Pol. Arch. Med. Wewn.* 46(3):305-314, 1971.

2518 THE PROBLEM OF HEPATITIS. (E.) Popper, H. (Mt. Sinai Sch. Med., New York, N. Y.). *Am. J. Gastroenterol.* 55(4):335-346, 1971.

2519 NEW CONCEPTS IN HEPATITIS. (E.) Villaverde, M. M. (Woodbridge State Sch. Hosp., N. J.) and J. A. Da Silva. *J. Med. Soc. NJ* 68(1):39-40, 1971.

2520 CONTINUOUS FLOW ULTRACENTRIFUGATION OF CANINE DISTEMPER VIRUS AND INFECTIOUS CANINE HEPATITIS VIRUS. (E.) Elliott, J. A. (U. Nebraska Coll. Med., Omaha) and W. L. Ryan. *Appl. Microbiol.* 20(5):667-671, 1970.

2521 HEPATITIS FOLLOWING EXCHANGE TRANSFUSION. (Ger.) Kaftan, D. (Justus Liebig U. Pediat. Clin., Giessen, Germany) and E. Gladtke. *Arch. Kinderheilkd.* 181(2):119-124, 1970.

2522 THE ACTIVITY OF LACTATE DEHYDROGENASE OF THE SERUM AND THE ISOENZYMES OF THE LACTATE DEHYDROGENASE OF HEPATIC TYPE IN VIRAL HEPATITIS. (Ser.) Radujkov, Z. (Med. Sch., Novi Sad, Yugoslavia), V. Mudric, D. Dulizibaric-Oreskovic and E. Dimic. *Med. Pregl.* 23(3-4): 105-111, 1970.

2523 HEPATITIS AND THE AUSTRALIA ANTIGEN. (It.) Bonomo, L. (Univ. 2nd Dept. Clin. Med., Bari, Italy) and F. Dammacco. *Recent Progr. Med. (Roma)* 48(6):529-536, 1970.

2524 AUSTRALIA ANTIGEN AND VIRAL HEPATITIS. I. HISTORY AND CLINICAL IMPORTANCE. (E.) Gust, I. D. (Fairfield Hosp., Australia) and J. Kaldor. *Aust. J. Med. Technol.* 1(3):3-7, 1970.

2525 HEPATITIS ASSOCIATED ANTIGEN AND ANTIBODY IN HAEMODIALYSIS PATIENTS AND STAFF. (E.) Knight, A. H., (Roy. Free Hosp., London), R. A. Fox, and R. A. Baillod. *Br. Med. J.* 3(5723):603-606, 1970.

2526 THE EFFECT OF THE INFECTIOUS HEPATITIS AGENT ON CHROMOSOMES. (Tur.) Tezok, F., (Gulhane Med. Acad., Ankara, Turkey), Y. Renda, and S. Aki. *Mikrobiyol. Bult.* 4(4):255-263, 1970.

2527 INDOCYANIN GREEN TEST IN THE ACUTE STAGE OF VIRAL HEPATITIS. (Pol.) Tkaczewski, W., (Med. Acad. Infect. Dis. Clin., Lodz, Poland), J. Matuszak and E. Karasek. *Pol. Tyg. Lek.* 25(52):2023-2025, 1970.

2528 THE HEPATITIS ASSOCIATED ANTIGEN (AUSTRALIA ANTIGEN). (E.) Alter, H. J. (NIH, Bethesda, Md.). *Am. Fam. Physician GP* 3(1):73-79, 1971.

2529 PRECIPITATING ANTIBODIES IN FRACTIONS OF SERA FROM PATIENTS WITH BOTKIN'S DISEASE. (E.) Strutsovskaya A. L., (M.F. Vladimirski Moscow Reg. Res. Inst. Clin.,), A. R. Reizis and A. V. Pichushkov. *Acta Virol. (Praha)* 15(1):111, 1971.

2530 AUSTRALIA ANTIGEN AND TRANSMISSION OF VIRAL HEPATITIS TO THE MONKEY. (Fr.) Eyquem, A., (Pasteur Inst., Paris), J. De Saint Martin and J. D. Levaditi. *Rev. Fr. Transf.* 13(3):275-284, 1970.

2531 TWO CASES OF VIRAL HEPATITIS COMPLICATED BY ACUTE HEMOLYTIC ANEMIA. (Rus.) Shapiro, S. E. and V. Z. Priven. *Ter. Arkh.* 42(11):118-120, 1970.

2532 DETERMINATION OF AUSTRALIAN ANTIGEN IN ACUTE VIRAL HEPATITIS IN YUGOSLAVIA. (Ser.) Kacaki, J., (Serbian Rheumatol. Inst., Belgrade, Yugoslavia), R. Kaljalovic and Z. Berovic. *Vojnosanit. Pregl.* 27(7-8):336-338, 1970.

2533 THE VIRAL CHARACTER OF THE AUSTRALIA ANTIGEN SH. (Rum.) Laszlo, I., (Inst. Pharmaceut. Med., Tirgu Mures, Rumania), L. Kasza, S. Munteanu and V. Filep. *Rev. Med. (Tirgu Mures)* 16(2):165-168, 1970.

2534 EVALUATION OF THE FUNCTIONAL STATE OF THE LIVER IN HEMATOLOGIC PATIENTS WITH DETECTABLE AUSTRALIA ANTIGEN OR ANTIBODIES IN THE BLOOD SERUM. (Pol.) Seyfriedowa, H. (Inst. Hematol., Warsaw, Poland), E. Kacperska and B. Zupanska. *Acta Haematol. Pol.* 1(4):317-325, 1970.

2535 ACETALPHOSPHATIDEMIA IN VIRAL HEPATITIS. (E.) Povoa, H., Jr. (Brazilian Rio Light Co. Med. Dept. Rio de Janeiro) and A. Coelho De Souza. *Acta Biol. Med. Ger.* 25(2): 351-353, 1970.

2536 THE AUSTRALIA ANTIGEN. THE PRESENT POSITION. (Fr.) Terrier, E. (Broussais Hosp., Paris). *Ann. Biol. Clin.* 28(4):287-294, 1970.

2537 ICTERIC AND NONICTERIC TRANSFUSION HEPATITIS. (Ger.) Schricker, K. T. (U. Erlangen Nuremberg Surg. Clin., Germany) and W. Ryba. *Fortschr. Med.* 88(35-36):1396-1398, 1970.

2538 DATA ON THE AUSTRALIA ANTIGEN. (Fr.) Lecoeur, D. and F. Marldor. *Arch. Med. Normandie* 10:647-650, 1970.

2539 OUR COMMERICAL BLOOD PROGRAM AND SERUM HEPATITIS. (E.) Allen, J. G. (Univ. Sch. Med., Stanford, Calif.). *Ann. Surg.* 172(5):927-928, 1970.

2540 DETECTION OF AUSTRALIA ANTIGEN IN PATIENTS HOSPITALIZED AT THE DEPARTMENT FOR INFECTIOUS DISEASES OF THE HOSPITAL AT CELJE. (PRELIMINARY REPORT). (Slovene) Lesnicar, J. (Celje Hosp., Yugoslavia). *Zdrav. Vestn.* 39(9): 359-363, 1970.

2541 THE BEHAVIOR OF HEPATITIS ASSOCIATED ANTIGEN (HAA) IN PATIENTS WITH VIRAL HEPATITIS. (Ger.) Lange, W. (Robert Koch Inst., Berlin), H. Kohler and J. Apodaca. *Zentralbl. Bakteriol.* [*Orig.*] 215(2):153-165, 1970.

2542 LEUKOCYTIC VIRUS OF HUMAN HEPATITIS. (E.) Shubladze, A. K., I. F. Barinski and I. V. Dementiev. *Vopr. Virusol.* (6):730-732, 1970.

2543 THE PRESENCE OF AUSTRALIA ANTIGEN AND SPECIFIC ANTIBODIES IN VIRAL HEPATITIS PATIENTS. (Rum.) Voiculescu, M., (Colentina Infect. Dis. Hosp., Bucharest, Rumania), D. State and M. Rosca. *Viata Med.* 17(15):681-684, 1970.

2544 AUSTRALIA ANTIGEN. (Dut.) Van Kooten Kok Doorschodt, H. J. and R. Van Den Akker. *Versl. Med. Volksgezondh.* 20:148-150, 1970.

2545 INFECTIOUS HEPATITIS. A CLINICO PATHOLOGICAL STUDY. (E.) Rahman, S., (Karachi, Pakistan), A. A. Hameedi and M. Ibrahim. *J. Pakistan Med. Assoc.* 20(10):320-325, 1970.

2546 IMMUNOLOGICAL TESTS IN LIVER DISEASES. (E.) Walker, J. G. (Middlesex Hosp., London). *Ann. Clin. Biochem.* 7(4):93-96, 1970.

2547 CORRELATION OF CERTAIN BIOCHEMICAL INDICES IN VIRAL HEPATITIS DEPENDING ON AGE. (Pol.) Lipinski, A. (Dist. Hosp., Turek, Poland) and R. Ozynski. *Wiad. Lek.* 23(14): 1189-1192, 1970.

2548 CHANGES IN THE LYMPHOCYTIC TISSUE CULTURES DURING THE COURSE OF INFECTIOUS HEPATITIS. (Cz.) Horejsi, J. (Inst. Hematol., Prague) and M. Krecek. *Vnitrn. Lek.* 16(9):833-840, 1970.

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2550 AUSTRALIA ANTIGEN AND VIRAL HEPATITIS IN SYDNEY. A HOSPITAL SERIES. (E.) Hawkes, R. A. (Prince Henry Hosp., Sydney, Australia). *Med. J. Aust.* 2(12):519-525, 1970.

2551 THE ADENOSINE DEAMINASE ACTIVITY IN INFECTIOUS HEPATITIS IN CHILDREN. (Ger.) Graessner, U., (Rostock Reg. Hosp., Germany), H. Kupatz and R. Nagel. *Dtsch. Gesundheitsw.* 25(41):1926-1929, 1970.

2552 POSTEMBRYONIC HISTOMORPHOLOGY AND HISTOCHEMISTRY OF LIVER CELLS IN DUCKLINGS. INVESTIGATIONS INTO THE PATHOGENESIS OF VIRAL DUCKLING HEPATITIS. (E.) Kapp, P. (U. Vet. Sci., Budapest, Hungary) and M. Balazs. *Acta Vet. Acad. Sci. Hung.* 20(3):309-323, 1970.

2553 DETERMINATION OF THE AUSTRALIAN SH ANTIGEN FOR THE PREVENTION OF TRANSFUSION HEPATITIS. (Ger.) Frohlich, C. *Hippokrates* 41(3):408-409, 1970.

See also numbers: 2151, 2445, 2447

CHRONIC HEPATITIS

2554 HEPATOGENIC CYANOSIS: ARTERIOVENOUS SHUNTS IN CHRONIC ACTIVE HEPATITIS. (E.) Kravath, R. E. (Montefiore Hosp., Bronx, N. Y.), E. M. Scarpelli and J. Bernstein. *J. Pediatr.* 78(2):238-245, 1971.

Measurements of hepatic, cardiovascular, and pulmonary function were made on a young girl (10 years old), with chronic active hepatitis and pulmonary arteriovenous fistulas. Pulmonary function studies demonstrated a low single-breath carbon monoxide diffusing capacity and increased residual volume. Arterial blood gas and pH revealed a compensated respiratory alkalosis with hypoxia and an estimated venoarterial admixture of 22-32% of the cardiac output. Esophagoscopy revealed small esophageal varices and portal pressure was elevated to 52 cm of water. Liver biopsy revealed active hepatitis with a plasmacytic infiltration, fibrosis, stromal collapse, and formation of pseudolobules. She was admitted to the hospital 4 times with the severity of her situation increasing each time and she died at the age of 16 (5 years after the onset of symptoms) after becoming comatose and oliguric. Postmortem examination of the pulmonary vasculature indicated several sites at which arteriovenous shunting presumably occurred.

2555 'ACTIVE' CHRONIC HEPATITIS. (It.) Pagliaro, L. (U. Palermo Inst. Med. Pathol., Italy). *Riv. Osped.* 2(3):219-225, 1970.

2556 BRONCHOPULMONARY CANCER ASSOCIATED WITH LUPOID HEPATITIS. (Rum.) Gherman, G. (Inst. Oncol., Cluj, Rumania) and V. Marza. *Oncol. Radiol.* 9(5):465-468, 1970.

See also numbers: 2427, 2442, 2518

CIRRHOSIS

2557 PRIMARY BILIARY CIRRHOSIS WITH SCLERODERMA, RAYNAUD'S PHENOMENON AND TELANGIECTASIA. NEW SYNDROME. (E.) Reynolds, T. B. (U. Southern California Sch. Med., Los Angeles), E. K. Denison, H. D. Frankl, F. L. Lieberman and R. L. Peters. *Am. J. Med.* 50(3): 302-312, 1971.

A newly recognized syndrome (CRST syndrome) characterized by the association of primary biliary cirrhosis with scleroderma, Raynaud's phenomena, telangiectasia and, occasionally, calcinosis cutis is described in 6 female patients. All patients had pruritis, jaundice, hepatomegaly, marked elevation of serum alkaline phosphatase, and a positive test for serum mitochondrial antibody. The extrahepatic bile ducts were normal. Only 1 patient had skin xanthoma, and none had xanthelasma. All 6 patients had telangiectasias typical of those seen in the Rendu-Osler-Weber syndrome. The other features (calcinosis, Raynaud's phenomena, sclerodactyly) were present to a varying degree. The association of primary biliary cirrhosis with a form of scleroderma suggests an immunologic etiology for this form of liver disease.

2558 LYMPHOVENOUS ANASTOMOSIS IN THE MANAGEMENT OF PORTAL HYPERTENSION. (E.) Bhalerao, R. A. (K.E.M. Hosp., Bombay, India), D. R. Trivedi and P. K. Sen. *Surgery* 69(4): 569-576, 1971.

In 68 patients with portal hypertension (56 cirrhotics, 6 with portal cavernoma with normal livers, and 1 with veno-occlusive disease) the thoracic duct was anastomosed end-to-end to the cardiac end of the transected internal jugular vein. Of 21 actively bleeding patients, control was accomplished in 15; however, 9 hemorrhaged 8 days to 6 weeks later and 7 ultimately died. At the time of operation 61 had resistant ascites; 40 were brought under control, 20 showed no change, and 1 exhibited an increase. Spleen size decreased immediately, and again after a few days, but did not disappear. Splenic pressures showed a fall in 18 of 31 patients, a rise in 11, and no change in 2. Liver function showed general improvement. This operation is mainly indicated in "poor-risk" cirrhotic patients who cannot undergo a venous-shunt operation; 50% have remained alive for more than 1 yr.

2559 QUANTITY AND QUALITY OF SURVIVAL AFTER PORTOSYSTEMIC SHUNTS. (E.) Foster, J. H. (Hartford Hosp., Conn.), L. H. Ellison, T. J. Donovan and A. Anderson. *Am. J. Surg.* 121(4):490-501, 1971.

A retrospective study of the results following portosystemic shunting in 133 patients is presented. Child's classification of risk closely correlated with immediate survival. Only 7 of 101 of Child's A and B risk patients died after either emergency or elective operation, and 3 of these deaths were due to thrombosis of the shunt with continued hemorrhage. Fourteen of 20 C-risk patients died, most of them after emergency operation. The factors of age, sex, or etiology of liver disease showed little correlation with operative survival; the most important factor was whether the operation was performed as an emergency. Cirrhotic patients who survived operation showed a continued decline in percentage survival for 10 yr after shunting. There was no significant difference between private and ward patients or between those under or over 50 yr of age. The highest percentage of long-term survivors occurred in B risk alcoholic male patients who discontinued alcohol ingestion after elective shunting. The continued decline in survival during the second 5 yr period in good risk patients, and the insignificant difference in long-term survival when correlation is made between various preoperative criteria, has reduced the ability to select preoperatively those patients who will do well after portal shunting.

2560 STIMULATION OF INSULIN SECRETION BY MEDIUM-CHAIN TRIGLYCERIDES IN PATIENTS WITH CIRRHOSIS. (E.) McCullough, F. S., M. Tzagournis, N. J. Greenberger (Ohio State U. Hosp., Columbus) and W. G. Linscheer. *Gut* 12(2):134-138, 1971.

The effect of administration of medium chain triglycerides (30 ml) on insulin secretion was studied in 40 patients with cirrhosis and 10 normal volunteers. Of the 12 cirrhotic patients with normal portal circulation (Group I), 2 had diabetes mellitus as determined by oral glucose tolerance test. Nine out of 28 cirrhotics with abnormal portal systemic communication (Group II) were found to be diabetic. In the fasting state there was no significant difference between the groups' serum insulin and serum glucose levels. However, there was a significant increase in the mean serum insulin levels at 30, 60, and 120 min after medium chain triglycerides in Group II. Mean serum glucose levels also tended to be higher in Group II patients with significant differences obtained at 60 and 120 min after glucose administration. The rise in serum insulin levels in Group II patients following administration of medium chain triglycerides may be due to shunting of insulin-containing portal blood around the liver and to a decrease in liver parenchyma extracting insulin.

2561 SPIRONOLACTONE DIURESIS IN PATIENTS WITH CIRRHOSIS AND ASCITES. (E.) Eggert, R. C. (U. Minnesota Hosps., Minneapolis). *Br. Med. J.* 4(5732):401-403, 1970.

The value of spironolactone in the treatment of ascites in cirrhosis was studied in 14 patients with cirrhosis and ascites due to chronic alcoholism using the urinary Na/K ratio to titrate individual dose of lactone. The individually regulated doses of spironolactone were effective in inducing diuresis in all treated patients, however, the diuresis was not as large and rapid as may be seen with more potent natriuretic agents. Diuresis was induced with 100 mg spironolactone/day in patients with a Na/K ratio of greater than 1, while 200-1000 mg/day was necessary in patients with a Na/K ratio of one or less. The dose of spironolactone required to effect the reversion of the urinary Na/K ratio seemed to reflect the degree of secondary aldosteronism in these patients. Hepatic encephalopathy and hypokalemia did not occur during diuresis.

2562 BUDD-CHIARI SYNDROME CAUSED BY A RIGHT ATRIAL TUMOR. (E.) Fiengold, M. L. (15 Chester Ave., White Plains, N. Y.), R. L. Litwak, S. S. Geller and M. M. Baron. *Arch. Intern. Med.* 127(2):292-295, 1971.

A previously unreported correctable cause of the Budd-Chiari syndrome in a 71-yr-old female is presented. The patient presented with mild hepatic encephalopathy; liver biopsy was compatible with Budd-Chiari syndrome. Angiograms showed complete obstruction of the inferior vena cava near its point of entry into the right atrium, and opacification of the right atrium suggesting a large filling defect within the chamber. At open-heart surgery, a large tumor was found in the right atrium, extending into the inferior vena cava. Histologically, the tumor proved to be a metastatic, poorly differentiated adenocarcinoma of unknown origin. The patient suddenly died 7 weeks later but no autopsy was performed. It is imperative to search for definitive causes for the Budd-Chiari syndrome since it may be possible to cure an otherwise lethal lesion.

2563 LACTULOSE TREATMENT OF HEPATIC ENCEPHALOPATHY IN OUTPATIENTS. (E.) Brown, H. (Boston City Hosp., Mass.), C. Trey and W. V. McDermott, Jr. *Arch. Surg.* 102(1):25-27, 1971.

Twenty cirrhotic patients who were greatly incapacitated by hepatic encephalopathy following portacaval shunt were placed for 1 week on a 1,200-calorie, 20-g protein diet. After baseline studies, dietary protein was gradually increased until the neurologic signs of hepatic encephalopathy were evident, and patients were then placed in a random double-blind fashion on about 15 ml of lactulose or sorbitol after meals and were discharged on this regimen, to be seen at monthly follow-up visits. A favorable response of 6-20 months in duration was seen in 9. Another 2 are doing well but have only been on this therapeutic regimen for a few months. Three were dropped from the study because of failure to cooperate. An additional 3 were eventually controlled on restriction of protein to 40-50 g/day. Three died early in their therapy, one from lymphoma and 2 from acute alcoholic hepatitis. Four cases are briefly reported.

2564 A CONTROLLED CLINICAL TRIAL OF LACTULOSE IN HEPATIC ENCEPHALOPATHY. (E.) Simmons, F. (VA Ctr., Los Angeles, Calif.), H. Goldstein and J. D. Boyle. *Gastroenterology* 59(6):827-832, 1971.

A group of 21 patients with hepatic encephalopathy were taken off neomycin 2 days before beginning a 10-day trial of either 4 daily doses of 20 g of lactulose (1,4-β-galactosidofructose) in 30 ml of a viscous, artificially flavored syrup or 4 daily doses of 15 g of glucose in 30 ml of a similar vehicle. All patients were placed on a 40 g/day protein diet, but this was increased to 60 g/day in those free of hepatic encephalopathy after the fifth day. Initially, both the lactulose and glucose (control) groups had similar mean encephalopathy ratings, but the lactulose group showed significant improvement at 5 and 10 days (the difference between day 5 and day 10 was not significant). Four patients (1 on lactulose and 3 controls) did not respond to treatment. Mean daily stool production was significantly greater in those on lactulose than in controls, while lactulose patients had significantly fewer days of diarrhea. Lactulose patients passed flatus for twice as long as did controls. Dosage of lactulose was increased in 4 and decreased in 3 patients for a mean dosage of 84 g/day (60-160 g/day) compared with a mean glucose dosage of 75 g/day. Initially, both groups had similar elevations of venous blood ammonia levels. At 5 days the 2 groups both showed slight decreases, but the differences between the 2 groups was not significant. After 10 days the lactulose group showed a significant decrease compared with controls. During the course of therapy in both groups no significant changes were seen in other liver function tests or in serum electrolytes or creatinine levels.

2565 ALCOHOL SALES AND SOCIOECONOMIC FACTORS RELATED TO CIRRHOSIS OF THE LIVER MORTALITY IN PENNSYLVANIA. (E.) Tokuhata, G. K. (Pennsylvania Dept. Health, Harrisburg), E. Digon and K. Ramaswamy. *HSMHA Health Reps.* 86(3): 253-264, 1971.

2566 SUSPENDED PARTICULATE AIR POLLUTION. RELATIONSHIP TO MORTALITY FROM CIRRHOSIS OF THE LIVER. (E.) Winkelstein, W., Jr. (U. California Sch. Public Health, Berkeley) and M. L. Gay. *Arch. Environ. Health* 22(1):174-177, 1971.

2567 THE VARIATION OF ARTERIAL LACTATE AND PYRUVATE IN NORMAL SUBJECTS AND CIRRHOTIC PATIENTS DURING AND AFTER ETHANOL INFUSION. (It.) Rinaldi, F. (U. Palermo Inst. Med. Pathol., Italy), L. Mancuso and A. Canonico. *Boll. Soc. Ital. Biol. Sper.* 45(23):1491-1494, 1970.

2568 MODIFICATIONS IN THE ARTERIAL GLYCEMIA IN NORMAL SUBJECTS AND IN CIRRHOTIC PATIENTS AFTER INFUSION OF ETHANOL. (It.) Casuccio, L. (U. Palermo Inst. Med. Pathol., Italy), F. Rinaldi and A. Canonico. *Boll. Soc. Ital. Biol. Sper.* 45(23):1494-1496, 1970.

2569 CYTOENZYMATIC REGULATION OF THE LIVER BY FREE NUCLEOTIDES. BIOPSIES OF PATIENTS WITH CIRRHOSIS, STEATOSIS AND DENUTRITION. (Fr.) Wegmann, R. (CHU Sch. Med., Paris), A. Charbonnier and F. Pergola. *Ann. Histochim.* 15(3):157-180, 1970.

See also numbers: 2105, 2152, 2153, 2418, 2433, 2438, 2441, 2442, 2445, 2447, 2450, 2451, 2514, 2666

GALLBLADDER AND BILIARY TRACT DISEASES

2570 A STATISTICAL SURVEY OF THE COMPOSITION OF GALLSTONES IN EIGHT COUNTRIES. (E.) Sutor, D. J. (Univ. Coll. Dept. Chem., London) and S. E. Wooley. *Gut* 12(1):55-64, 1971.

Gallstones from the United States (87), Germany (50), England (47), Sweden (45), Kuwait (36), South Africa (26), India (19) and Australia (45) were analyzed using the X-ray powder method to determine the crystalline composition. Seventy one percent of the total crystalline material in the stones consisted of cholesterol II, cholesterol monohydrate, and anhydrous cholesterol, 15% was calcium carbonates (vaterite, aragonite, and calcite) and 6% was calcium palmitate. The four other compounds identified were apatite, sodium chloride, whitlockite and α-palmitic acid. Although age of the patient was not related to the composition of gallstones, female patients formed much more cholesterol while males formed much more calcium palmitate and calcium carbonate. Gallstones from England had more carbonate; those from South Africa had less cholesterol and more calcium phosphate and calcium palmitate; those stones from India had an excess of calcium phosphate; and Kuwatian stones had increased calcium palmitate. While most components were disoriented crystallites, anhydrous cholesterol and cholesterol monohydrate can occur as single crystals oriented with respect to the nucleus.

2571 LITHOGENIC BILE AMONG YOUNG INDIAN WOMEN. LITHOGENIC POTENTIAL DECREASED WITH CHENODEOXYCHOLIC ACID. (E.) Thistle, J. L. (Mayo Clin., Rochester, Minn.) and L. J. Schoenfield. *N. Engl. J. Med.* 284(4):177-181, 1971.

Chippewa Indian women have a known high prevalence of symptomatic gallstones. Lithogenic bile is characterized by a low ratio of bile acids plus lecithin to cholesterol. The ratios of the cholesterol-solubilizing agents, bile acids and lecithin, to cholesterol in duodenal bile obtained from 12 nulliparous Indian women without gallstones, 6 nulliparous white women, 6 Indian men and 6 white men were measured. Ten of the 12 Indian women received either chenodeoxycholic acid (0.75 to 1 g/day) or placebo for 2 months with repeat duodenal analysis after treatment. Prior to treatment, the ratios of bile acids plus lecithin to cholesterol among the Indian women were significantly lower (9.4 ± 0.82), than among white subjects (16.4 ± 1.0), and Indian men (14.8 ± 22), but not different from those previously reported among white women with gallstones (11.3 ± 1.3). Following treatment with chenodeoxycholic acid, the bile acid composition was 96% chenodeoxycholic acid and the ratio of bile acid plus lecithin to cholesterol increased significantly to 14.2 ± 1.9, without side effects. It is suggested that lithogenic bile precedes gallstone formation in these Indian women and that the administration of chenodeoxycholic acid significantly decreases this lithogenic potential.

2572 CHOLEDOCHODUODENOSTOMY FOR GALLSTONES. (E.) Sawyer, R. B. (Presbyterian Med. Ctr., Denver, Colo.) and K. C. Sawyer. *Arch. Surg.* 102(4):308-311, 1971.

Choledochoduodenostomy was performed in 14 patients with calculous disease of the biliary tree with or without associated problems (stricture, pancreatitis, multiple small liver abscesses). The alleged objection to side-to-side choledochoduodenostomy, that it predisposes ascending cholangitis (due to free regurgitation of duodenal contents into the biliary tree) was not confirmed. In patients with recurrent common duct stones, sand, highly friable stones, or multiple debris, when simple cleaning of the duct is impossible, choledochoduodenostomy can be valuable. This surgical technique should not be performed on a normal sized duct or in the presence of acute infection or acute pancreatitis. This technique is particularly useful in the elderly, debilitated patient who should not be subjected to a prolonged operation.

2573 ROLE OF SULFATED GLYCOPROTEIN IN GALLSTONE FORMATION. (E.) Maki, T. (Tohoku U. Sch. Med., Sendai, Japan), T. Matsushiro, N. Suzuki and N. Nakamura. *Surg. Gynecol. Obstet.* 132(5):846-854, 1971.

Histochemical studies of thin serial sections of gallstones and other calculi revealed the presence of mucosubstances with metachromatic basophilia, positive responses periodic-acid Schiff staining and alcianophilia. These substances were distributed diffusely over the entire area of a section and were so arranged around particles or crystals as if to connect the particles and crystals with one another. Chemical analysis of mucosubstances in gallstones and bile from patients with pathologic conditions, especially those with infected bile, contained large amounts of sulfated glycoproteins with very small amounts of sulfated hybrid glycosaminoglycan-proteins, in addition to large amounts of glycoproteins. Bile samples from controls showed no acidic mucosubstances. A study of the coagulating (precipitating) effect (against $CaCO_3$) of mucosubstances obtained from the gastrointestinal tracts of human beings and rabbits revealed the acidic fraction to have the most powerful coagulating effect while a sulfated glycogen mucosubstance isolated from bile of humans infected with Escherichia coli showed the greatest coagulation effect. Sulfated glycoproteins play an important role in the growth of gallstones and other calculi due to their coagulation properties.

2574 CHOLESTEROL GALLSTONES AND THE CHEMICAL COMPOSITION OF BILE IN BABOONS. (E.) McSherry, C. K. (New York Hosp.-Cornell Med. Ctr., N. Y.), N. B. Javitt, J. M. de Carvalho and F. Glenn. *Ann. Surg.* 173(4):569-577, 1971.

Cholesterol gallstones were found in 2 of 15 adult female baboons and 1 of 6 pregnant baboons. Mean plasma cholesterol and phospholipid concentrations in pregnant animals were significantly less than in nonpregnant controls. Pregnant animals also had an increased cholesterol and decreased bile salt content in gallbladder bile, which are both additive factors creating conditions favorable for the precipitation of cholesterol and the initiation of gallstone formation. Cholesterol, phospholipid and bile salt content of samples of gallbladder and hepatic bile were plotted on triangular phase diagrams. Gallbladder bile in most control animals was in the micellar zone, apparently as a result of the ability of the gallbladder to concentrate bile salts to a much greater extent than cholesterol or phospholipids. This ability was absent or greatly diminished in pregnant animals. Both control nonpregnant and pregnant animals secreted hepatic bile supersaturated with cholesterol and out of the micellar zone. These results suggest that stone formation is initiated in the gallbladder rather than the liver. The ability of the gallbladder to concentrate bile salts may be an important factor in cholesterol precipitation from gallbladder bile.

2575 EXPERIMENTAL FORMATION OF GALLSTONES IN THE SQUIRREL MONKEY. (E.) Osuga, T. (Oregon Reg. Primate Res. Ctr., Beaverton) and O. W. Portman. *Proc. Soc. Exp. Biol. Med.* 136(3):722-726, 1971.

Ninety-four mature male and female squirrel monkeys were divided into 4 diet groups. One group of 19 monkeys was fed a natural diet for 4 months then sacrificed. The second group of 33 monkeys was fed a basal semipurified diet not associated with atherosclerosis; the third group of 33 monkeys was fed a semipurified diet (high butter) consistently associated with hypercholesterolemia and atherosclerosis. Animals in the second and third groups were sacrificed from 2 weeks to 13 months later. The fourth group of 9 monkeys was fed the atherogenic-hypercholesterolemic diet for 3 months and then changed to the basal semipurified diet for 3-5 months before sacrifice. In the second group, 3 monkeys had small stones developing between the third and sixth months but none developed stones after the 6 months in this group. In group 3, gallstones appeared by the third months and their number and size increased with the duration of diet; after 9 months, 83% had gallstones. The gallstones consisted essentially of pure cholesterol and the cholesterol:phospholipid ratio in bile was highest in the group and the individuals with stones. No stones were found in the group fed a natural diet or the fourth group whose original atherogenic died had been changed to a basal diet.

2576 STEROID-INDUCED INTRAHEPATIC CHOLESTASIS IN MICE. (E.) Imai, K. (Shionogi Co. Res. Lab., Osaka, Japan) and Y. Hayashi. *Jap. J. Pharmacol.* 20(4):473-481, 1970.

The livers of norethisterone treated mice (> 50 mg/kg x 5 days) were enlarged and colored dark brown and an icteric coloration of the skin was noted in the high dosage groups. Bile plugs were noted in the biliary canaliculi as well as in the interlobular biliary ducts. The hepatic cells appeared to be swollen, exhibited a decrease of cytoplasmic basophilia and occasionally contained bile pigment granules. The severity of the hepatic lesions as indicated by the liver weight and incidence of bile plug formation appeared to be dose dependent. Dilatation of the biliary canaliculi together with distortion or reduction of the canalicular microvilli were noted, amorphous, fine granular or fibrillar materials occasionally filled the bile canaliculi. The plasma bilirubin level (mostly direct reacting type), plasma alkaline phosphatase, SGOT, and SGPT were all significantly increased in norethisterone treated mice. Besides norethisterone, various other C_{17} alpha-substituted steroids including methyltestosterone, oxymetholone and norethandrolone caused intrahepatic bile plug formation in mice while neither testosterone propronate, progesterone or estradiol-17β elicited such effects. In contrast to mice, Sprague-Dawley rats did not exhibit extensive morphological alterations even after administration of 1,000 mg norethisterone/kg for 5 days. The mechanism of the cholestatic effect of the steroids in unknown; however, the occurrence of conjugated hyperbilirubinemia and canalicular bile plugs may support the view that steroids prevent the transportation of conjugated bilirubin into the biliary canaliculi by blocking a stage following conjugation.

2577 ACUTE CHOLECYSTITIS WITH PERFORATION INTO THE PERITONEAL CAVITY. (E.) Abu-Dalu, J. and I. Urca (Beilinson Hosp., Petach-Tiqva, Israel). *Arch. Surg.* 102(2): 108-110, 1971.

Of 23 patients presenting between 1960-1968 with acute cholecystitis and perforation into the peritoneal cavity (a rare disorder before 1960 in an area in Tel Aviv, Israel) 20 were over 50 years of age and most had a history of abdominal pain. In about half of the patients the physical findings were atypical for peritonitis; however, patients did demonstrate apathy, pinched nose, sunken cheeks and dry, furred tongue. In all patients free bile was found in the peritoneal cavity and signs of acute inflammatory changes noted in the gallbladder. Cholecystectomy was performed in 20 patients (a T-drain being inserted in 3 of them) and 1 underwent cholecystostomy. All 21 undergoing surgery survived. It is suggested that dietary factors may have played a role in this change in the natural history of acute cholecystitis in Israel. Early cholecystectomy in older patients with acute cholecystitis is suggested not only because of the operative success in the present series, but also because of a previously documented mortality rate increase due to delayed surgery.

2578 SERIAL SERUM CHOLESTEROL ESTIMATIONS AFTER BILIARY-TRACT SURGERY. (E.) Walmsley, M. J. (Park Hosp., Davyhulme, Manchester, England), J. Waddecar and P. F. Schofield. *Br. J. Surg.* 57(11):829-831, 1970.

Patients with cholecystectomy alone or combined with common bile duct drainage demonstrated decreased serum cholesterol values. The mean maximum decrease was 30% (at day 6) and 36% (at day 9), resp. The total amount of bile cholesterol removed by cholecystectomy was high in the well functioning gallbladder: not only was the concentration high but the volume of the gallbladder was large so that cholesterol loss at operation was much greater than daily loss by draining the common bile duct. Removal of the shrunken, contracted gallbladder, where the cholesterol concentration was often similar to that in the common bile duct and the volume was small, contributed much less to the patient's total loss of cholesterol than drainage of the common bile duct. Depletion of bile salts or some disturbances of cholesterol synthesis may be responsible for decreased cholesterol levels following biliary tract surgery.

2579 ACALCULOUS ADENOMYOMATOSIS OF THE GALLBLADDER. (E.) Bevan, G. (Edgware Gen. Hosp., Middlesex, England). *Gut* 11(12): 1029-1034, 1970.

Six cases of acalculous adenomyomatosis are presented. Each patient had undergone radiological investigation of the entire gastrointestinal tract on more than one occasion in addition to several cholecystograms. In all instances the absence of gallstones and the ability of the gallbladder to concentrate and excrete dye adequately had delayed surgical treatment. When symptoms suggestive of biliary tract disease occur in association with the cholecystographic appearances of acalculous adenomyomatosis, cholecystectomy should be performed if there is no other obvious cause for the symptoms. Although the mechanism by which the associated pain is produced is unknown, it may be due to excessive neuromuscular activity of the hyperplastic gallbladder wall resulting in vigorous contraction and distension of the ducts.

2580 BILIARY BACTEREMIA. (E.) Chetlin, S. H. (Western Pennsylvania Hosp., Pittsburgh) and D. W. Elliott. *Arch. Surg.* 102(4):303-307, 1971.

The records of 1421 patients who had had biliary operations were reviewed for the results of bile cultures taken at surgery, antibodies administered, complications, and death. Of the 1,194 who had cholecystectomy and 227 who had common duct surgery, the mortality was 1% and 4.8%, respectively. Of the 22 deaths, 9 (41%) were due to septic complications. Approximately 35% of the cultures were positive with 69% exhibiting gram-negative coliforms and 21% with gram-positive organisms. Patients 70 years of age or older had a very significant risk of biliary bacteremia (72%), regardless of the type of operation performed, and patients with common duct stones with or without jaundice also exhibited high rates of biliary bacteremia. The incidence of specific nonbacteriologic complications was 40 times higher in those patients with positive cultures.

2581 CONGENITAL DILATATION OF THE HEPATIC DUCT. ONE RESECTION AND ANASTOMOSIS. (Fr.) Salembier, Y., G. Martin and M. Houcke. *Lille Chir.* 25(4-5):200-204, 1970.

2582 THE MOLECULAR BIOLOGY OF CHOLESTASIS. (E.) Schaffner, F. (Mt. Sinai Sch. Med., New York, N. Y.). *Digestion* 4(2):117-120, 1971.

2583 BENIGN RECURRENT OBSTRUCTIVE JAUNDICE IN PREGNANCY. (It.) Finardi, G. (U. Pavia Inst. Semiot. Med., Italy), F. Gastaldi and P. Bergamaschi. *Fegato* 16(2): 419-436, 1970.

2584 CHRONIC NONCALCULOUS CHOLECYSTITIS. (Fr.) Paraf, A. (Franco Musulman Hosp., Bobigny, France) and J. Trad. *Clinique* 65(673): 735-737, 1970.

2585 SIGNIFICANCE OF TOMOGRAPHY OF THE BILE TRACT FOLLOWING CHOLECYSTECTOMY. (Rus.) Pekerman, M. I. *Vestn. Rentgenol. Radiol.* 45(4): 66-70, 1970.

2586 ROENTGENOLOGIC INVESTIGATION IN RECONSTRUCTIVE BILE DUCT SURGERY. (Rus.) Tretiakova, T. A. and Z. A. Topchiashvili. *Vestn. Khir.* 105(8):56-58, 1970.

2587 PROBE BOUGIE WITH CHANGEABLE TIPS USED IN SURGERY OF THE BILIARY TRACT. (Rus.) Glivenko, I. A. *Klin. Khir.* (9):88-89, 1970.

2588 CONGENITAL CYSTIC DILATATION OF THE COMMON BILE DUCT: A REVIEW. (E.) Konvolinka, C. W. (Geisinger Med. Ctr., Danville, Pa.) and W. F. Pharr. *Am. Surg.* 36(9):575-580, 1970.

2589 PRIMARY CARCINOMA OF THE GALLBLADDER. A TEN YEAR REVIEW. (E.) Hardy, M. A. (Albert Einstein Coll. Med., Bronx, N. Y.) and H. Volk. *Am. J. Surg.* 120(6):800-803, 1970.

2590 FLOATING BILE CALCULI. (Bul.) Strezov, S. *Rentgenol. Radiol. (Sofiia)* 9(3): 200-204, 1970.

2591 JAUNDICE AFTER TREATMENT OF LEUKAEMIA WITH BUSULPHAN. (E.) Underwood, J. C. E. (Roy. Infirm., Sheffield, England), R. T. Shahani and E. K. Blackburn. *Br. Med. J.* 1(5748):556-557, 1971.

2592 DISEASES OF THE GALLBLADDER. (Fr.) Varay, A. (Beaujon Hosp., Paris). *Rev. Prat. (Paris)* 21(1):67-84, 1971.

2593 HEMATOBILIA. (Sp.) Sandblom, P. (Univ. Surg. Klin., Lund, Sweden). *Prensa Med. Argent.* 57(10):467-470, 1970.

2594 OPERATIVE CHOLANGIOGRAPHY IN ACUTE CHOLECYSTITIS. (E.) Schulenburg, C. A. R. *Med. Proc.* 16(19):318-321, 1970.

2595 FIVE CASES OF CANCER OF THE AMPULLA OF VATER. (Fr.) Benyahia, D., N. Benyahia, G. Catanzano and A. Maouni. *J. Med. Maroc* 6(5):327-333, 1970.

2596 INDUCTION OF CHANGE IN BILE FLOW BY ORAL ADMINISTRATION OF BUSCOPAN (SCOPOLAMINE BUTYLBROMIDE) IN THE SORBITOL TEST. (Ger.) Boriss, W. (Gen. Hosp., Hamburg, Germany), G. Goldmann and G. Knode. *Med. Welt* 22(10): 402-404, 1971.

2597 CARCINOMA OF THE BILIARY TRACT COMPLICATING CHRONIC ULCERATIVE COLITIS. (E.) Morowitz, D. A. (Washington Hosp. Ctr., D. C.), S. Glagov, E. Dordal and J. B. Kirsner. *Cancer* 27(2):356-361, 1971.

2598 CONGENITAL CYSTIC DILATATION OF THE EXTRAHEPATIC BILE DUCTS. (Rum.) Firica, T. (Colentina Hosp., Bucharest, Rumania), V. Gradinarv and M. Radulescu. *Chirurgia (Bucur.)* 19(6):481-486, 1970.

2599 SURGERY OF BENIGN OBSTRUCTIVE JAUNDICE. (Ger.) Kern, E. (Univ. Surg. Clin., Wurzburg, Germany) and H. Schott. *Chirurg* 41(12): 540-545, 1970.

2600 AUTOPLASTIC RECONSTRUCTION OF THE COMMON BILE DUCT USING THE APPENDIX. (Ger.) Muhe, E. (U. Erlangen Nuremberg Surg. Clin., Germany), P. Hermanek and G. Donath. *Chirurg* 41(12):560-564, 1970.

2601 HETEROTOPIC PANCREATIC TISSUE IN THE COMMON BILE DUCT OR AMPULLA OF VATER. (E.) Sabini, A. M. (Ehrling Bergquist USAF Reg. Hosp., Omaha, Neb.), J. P. Baden, J. D. Norman and J. R. Martin. *Am. Surg.* 36(11):662-666, 1970.

2602 MULTIPLE BILE DUCT HAMARTOMAS. (E.) Chung, E. B. (Howard U. Coll. Med., Washington, D. C.). *Cancer* 26(2):287-296, 1970.

2603 ANOMALIES OF THE GALLBLADDER. (Rus.) Toskin, K. D. and A. S. Firkovich. *Vestn. Khir.* 105(8):119-120, 1970.

See also numbers: 2050, 2118, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2178, 2438, 2565

2604 HEREDITARY ANGIONEUROTIC OEDEMA: AN UNUSUAL CAUSE OF RECURRING ABDOMINAL PAIN. (E.) Feller, E. J., H. M. Spiro (Yale-New Haven Hosp., Conn.) and L. A. Katz. *Gut* 11(12): 983-988, 1970.

Two cases of hereditary angioneurotic edema are discussed with special reference to the gastrointestinal manifestations. This disorder is characterized by a lack of complement-1 esterase inhibitor activity in the plasma and recurrent severe abdominal pain and edema. Areas of edema were hard, seldom painful or pruritic, and were often sharply demarcated from adjacent normal tissue. They were pale, rarely red, and usually cool to touch. Recurrent abdominal pain often represents a diagnostic dilemma, particularly when it precedes the onset of edema by several years, or when the family history is not clear. In these 2 cases, multiple surgical procedures were performed before the diagnosis was made. Radiological demonstration of intestinal edema is helpful only if the examination is done while the patient is still symptomatic.

2605 AUTOPSY FINDINGS IN THE UPPER GASTROINTESTINAL TRACT OF 81 BURN PATIENTS. A REVIEW. (E.) Law, E. J. (U. Cincinnati Med. Ctr., Ohio), S. B. Day and B. G. MacMillan. *Arch. Surg.* 102(4):412-416, 1971.

The autopsy findings in the upper gastrointestinal tract of 81 burn patients were reviewed. Of the 81 patients 46.9% had erosive lesions occurring in the esophagus (18.5%), stomach (27.7%) or duodenum (11.1%), and 23.5% of the 81 had lesions deep enough to be classified as ulcers. The incidence of ulceration in the stomach and duodenum was about 3 times as high in children as in adults. The incidence of gastric and esophageal lesions in patients in whom Levin tubes were inserted was roughly double that found in those patients who never had such tubes inserted. In 13.8% of the cases, there was gastrointestinal tract bleeding of sufficient severity to cause a clinical problem. Septicemia was felt to be the major cause of death in 42 cases, 29 of which had Pseudomonas aeruginosa. Burn size was not correlated with the presence of erosive lesions.

2606 EOSINOPHILIC GASTROENTERITIS: A SIMPLE REACTION TO FOOD ALLERGENS? (E.) Leinbach, G. E. (Harborview Med. Ctr., Seattle, Wash.) and C. E. Rubin. *Gastroenterology* 59(6): 874-889, 1971.

In a case of eosinophilic gastroenteritis, a complete loss of intestinal villi and marked epithelial abnormalities were demonstrated in areas of intense infiltration with eosinophilic leukocytes. Since the mucosal damage was patchy, multiple suction biopsies were obtained to establish the suspected diagnosis of reaction to food allergens. Positive skin tests were found to a large number of foods but they did not agree with the clinical symptoms. The patient responded dramatically to a strict elimination diet both symptomatically and by laboratory tests; nevertheless, these responses were brief and incomplete (persistent eosinophilia). Challenge with soybean formula and beefsteak produced no significant histologic changes despite the symptoms produced (nausea, vomiting and abdominal pain postprandially). High doses of corticosteroids induced a dramatic remission despite normal dietary intake. Apparently eosinophilic gastroenteritis is not a simple allergic process that can be reversed by removal of certain food allergens.

2607 ACUTE UNDIFFERENTIATED HUMAN DIARRHEA IN THE TROPICS. I. ALTERATIONS IN INTESTINAL MICROFLORA. (E.) Gorbach, S. L. (Cook County Hosp., Chicago), J. G. Banwell, B. D. Chatterjee, B. Jacobs and R. B. Sack. *J. Clin. Invest.* 50(4):881-889, 1971.

A group of 17 patients residing in Calcutta, India were diagnosed with acute undifferentiated diarrhea and were divided into 2 groups consisting of 8 with mainly Escherichia coli organisms and 9 with mixed coliform flora. Of the 8 with E. coli predominance, 5 had a single serotype in the small and large bowel. Components of the normal microflora were also present during the acute episode. Broth filtrates of the coliform isolates contained an enterotoxin which caused fluid to accumulate in a preparation of rabbit intestinal loop. During the acute period, those toxigenic E. coli were cleared rapidly from the small intestine. During the convalescent period, there was a change in the bowel serotypes and fecal organisms, and only 1 of the 8 had a serotype which caused diarrhea during the acute phase. The convalescent phase strains did not liberate the toxin. In the mixed coliform groups of 9 patients, during the acute phase the fecal microflora contained several serotypes and biotypes of enteri bacteria and it was difficult to select a predominant strain. Small numbers of coliforms (E. coli, Klebsiella, and Enterobacter) persisted in the jejunum of 3 of 5 patients during the convalescent phase.

2608 ACUTE UNDIFFERENTIATED HUMAN DIARRHEA IN THE TROPICS. II. ALTERATIONS IN INTESTINAL FLUID AND ELECTROLYTE MOVEMENTS. (E.) Banwell, J. G. (Infect. Dis. Hosp., Calcutta, India), S. L. Gorback, N. F. Pierce, R. Mitra and A. Mondal. *J. Clin. Invest.* 50(4):890-900, 1971.

A group of 17 patients from the tropics were diagnosed with acute undifferentiated diarrhea and were divided into 2 groups on the basis of their observed small intestinal flora (one group had predominantly Escherichia coli, the other had mixed flora) and compared with regard to fluid and electrolyte loss. In the E. coli group, 4 of 7 patients demonstrated net fluid secretion into the jejunal lumen and in the mixed flora group, 3 of 7 were secreting; however, the mean jejunal transport rate was significantly greater in E. coli diarrhea than in mixed flora diarrhea (+1.65 versus 1.03 ml/hr/cm). Net fluid secretion in the ileum occurred in 4 patients in the E. coli group, while only 1 of 6 patients with mixed flora were secreting in this region. Intestinal fluid composition was similar to that of normal individuals with higher HCO_3^- concentration in the ileum than in the jejunum but remained isotonic in both regions. Most patients recovered normal fluid and electrolyte absorption in both jejunum and ileum within 6-8 days after the onset of symptoms. An increase of 3-to 4-fold in lumen to plasma and plasma to lumen flux for Na^+ and H_2O above normal levels was encountered in the acute disease. Specimens from the jejunum and ileum of all patients were similar, showing moderate chronic inflammatory infiltration of the lamina propria and slight blunting of villi.

2609 SMALL INTESTINAL BACTERIAL FLORA AND FOLATE STATUS IN GASTROINTESTINAL DISEASE. (E.) Hoffbrand, A. V. (Roy. Postgrad. Med. Sch., London), S. Tabaqchali, C. C. Booth and D. L. Mollin. *Gut* 12(1):27-33, 1971.

The relation of serum folate level to number, type, and distribution of bacteria in the small intestine was examined in 13 patients with jejunal diverticulosis, 29 patients after partial gastrectomy, 5 patients with ileal disease, and 25 healthy subjects. The mean serum folate levels of the partial gastrectomy patients were not significantly different from those of control subjects but the mean serum folate levels in those patients with jejunal diverticulosis were significantly greater than in controls. The mean urinary folate excretion was elevated in patients with jejunal diverticulosis, all of which had Escherichia coli present in jejunal aspirates in concentrations ranging from 10^4 to 10^9 bacteria/ml. The mean serum folate level of patients with partial gastrectomy without E. coli was significantly higher than that of the group with E. coli in the jejunal fluid. High E. coli counts in the ileum, unlike high counts in the jejunum, were not associated in any patient with a raised serum folate level. In gastrointestinal disease, jejunal bacteria may contribute to the serum folate level.

2610 ACCURACY OF DIAGNOSIS OF BACTERIAL DIARRHEAL DISEASE BY CLINICAL FEATURES. (E.) Nelson, J. D. (5323 Harry Hines Blvd., Dallas, Tex.) and K. C. Haltalin. *J. Pediatr.* 78(3):519-522, 1971.

The reliability of assessing the likelihood of bacterial enteritis on the basis of clinical features was studied in 144 infants and children from 122 families during a 5-month period from June to November, 1969. All had mild to moderate diarrhea and were cared for by 7 senior pediatric residents who gave clinical impressions of shigellosis, salmonellosis, enteropathogenic Escherichia coli., or "nonbacterial" diarrhea. Rectal swabs were cultured by standard methods. In 55 patients the clinical impression was bacterial diarrhea; 41 (75%) had a bacterial pathogen on culture. The correct pathogen had been suspected in 67%. In 89 patients the clinical impression was nonbacterial diarrhea; 63 (71%) had negative stools. Overall differentiation between bacterial and nonbacterial diarrhea was correctly made in 89 of 122 families. The experienced physician should be able to rely upon his estimate of the probability of bacterial diarrheal disease in deciding the need for culture or antibiotic therapy.

2611 MULTIPLE HEMANGIOMAS OF THE GASTROINTESTINAL TRACT IN CHILDREN. (E.) Mellish, R. W. P. (U. Vermont Div. Pediat. Surg., Burlington). *Am. J. Surg.* 121(4):412-417, 1971.

The case histories of 2 children with multiple gastrointestonal hemangiomas, surface hemangiomas, and severe gastrointestinal bleeding are presented. Each child underwent resection of approximately 200 hemangiomas of the bowel. The surgical management in one or both patients included: 1) segmental resection with end-to-end anastomosis, 2) enterotomy with wedge excision and transverse closure, 3) intussusception at sites of wedge excision exposing lesions above and below, 4) serosal incisions with extrusion of the lesion, and 5) transfixion or suture ligation through the serosa. Initial examination should include coagulation studies. Both children are alive and well 6 and 12 yr following initial treatment and multiple operative procedures.

2612 THROMBOTIC ULCERATIONS OF THE GASTROINTESTINAL TRACT. (E.) Margaretten, W. (U. California Sch. Med., San Francisco) and D. G. McKay. *Arch. Intern. Med.* 127(2):250-253, 1971.

Pathological findings at autopsy from 89 cases with hemorrhagic lesions of the gastrointestinal tract are presented, with particular attention to the presence of microvascular fibrin thrombi. The clinical histories were reviewed and coagulation studies which had been performed in those patients who presented the clinical symptoms of hemorrhagic diathesis were also reviewed. There were 60 cases with acute ulcerative lesions of the stomach, 7 of the duodenum, 11 of the remainder of the small bowel, and 27 of the colon. Solitary lesions were found in 15 patients while multiple hemorrhagic ulcerations were found in 74. Most lesions were superficial and primarily involved the mucosa in a random nonvascular (i.e., large vessel) pattern. Microvascular fibrin thrombi were present in more than 66% of the cases. Actual infarct necrosis of the mucosa was seen whenever intravascular thrombi were identified; when thrombi were absent, hemorrhagic necrosis only without infarction was present. Forty-eight patients had evidence of intravascular coagulation (reduction of clotting factors and/or platelets). Sixty-five patients had prolonged hypotensive episodes; many were in severe shock and received multiple transfusions and vasoactive agents. These studies indicate a thrombotic etiology in acute hemorrhagic ulcerations of the gastrointestinal tract.

2613 SELECTIVE ARTERIAL INFUSIONS OF VASOCONSTRICTORS IN ACUTE GASTROINTESTINAL BLEEDING. (E.) Rösch, J. (U. Oregon Med. Sch., Portland), C. T. Dotter and R. W. Rose. *Radiology* 99(1):27-36, 1971.

Either epinephrine alone (8-20 μg/min for 4-40 min.) or a combination of epinephrine (8-12 μg/min) and 3-5 mg propanolol (for 4-30 min) were inj. i.a. in 7 pts. with gastric bleeding (perfusion of the celiac in 4, left gastric in 2, gastroduodenal artery in 1), 3 with duodenal bleeding (celiac, hepatic and gastroduodenal in 1 each) and 6 with colonic bleeding (superior mesenteric in 1 and inferior mesenteric in 5). Epinephrine alone was infused into the celiac artery or its branches, the epinephrine-propanaolol mixture into the mesenterics. In 11 of the 16 patients, infusion was followed immediately by complete and permanent cessation of bleeding into the gastrointestinal tract; this group included 4 with gastric (56%), 1 with duodenal (33%) and 6 with colonic (100%) bleeding. Partial control was seen in a 76-yr-old patient with a penetrating duodenal ulcer eroding a branch of the cystic artery who also had advanced arteriosclerotic disease. Three with gastric or duodenal bleeding had cirrhosis and coagulation defects and began to rebleed as soon as infusion was terminated; another with terminal uremia and coagulation defect showed a decrease in bleeding during infusion. In another 5 with bleeding esophageal varices, infusion of the superior mesenteric artery with pitressin (0.3 U/min in 4, 0.1 U/min in 1) for 1-6 hr led to complete control of bleeding in 3, temporary control in 1 and no control in the last, who had a coagulation defect.

2614 EXPERIMENTAL APPROACH IN STUDIES ON PATHOGENESIS OF BACILLARY DYSENTERY -- WITH SPECIAL REFERENCES TO THE INVASION OF BACILLI INTO INTESTINAL MUCOSA. (E.) Ogawa, H. (Daiichi Seiyaku Co. Res. Labs., Tokyo). *Acta Pathol. Jap.* 20(3):261-277, 1970.

Histological examination of lesions in the large bowel produced by experimental infection with Shigella and Shigella-like groups of enteropathogenic Escherichia coli in monkeys and other animal systems was performed to study the pathogenic behavior of these organisms. All of the specimens from animals sacrificed at the peak of their disease (3-8 days after infection) were characterized by catarrhalic (7 animals) or diphtheric colitis (5 animals) accompanied by mucosal necrosis, microulcers, and crypt abscesses. The organisms showed special affinity to epithelial cells and their invasion into these cells of the colonic mucosa in the initial stage of infection is the indispensable factor for progression of the pathological alterations observed.

2615 PANCREATIC ENZYME INHIBITORS IN HEALTH AND DISEASE. (E.) Maneche, H. C., T. M. Paul and D. S. Kahn (St. Mary's Hosp., Montreal Quebec, Canada). *Am. J. Clin. Pathol.* 55(4):458-464, 1971.

Pancreatic enzyme inhibitor activities were measured using simple colorimetric techniques in sera of 27 pregnant women, 136 patients with acute or relapsing pancreatitis, 25 with acute or chronic cholecystitis and cholelithiasis, 12 with hepatitis or cirrhosis with liver cell necrosis, 10 with active duodenal ulcer, 20 with chronic pulmonary disease with superimposed infection, 15 with carcinoma of the breast, 24 with various types of metastatic carcinoma and 80 normal controls. Serum antitrypsin-like (SAT) activity and serum anti-chymotrypsin like (SACHT) activity were both elevated over controls in all groups except the one comprised of patients with breast carcinoma (which showed no increases) and the group of patients with liver disease (which had elevated SACHT activity levels but not SAT levels). No significant changes were seen after food intake or after stimulation of pancreatic secretion by the administration of secretin. SAT determination may be useful in differentiating pancreatitis from hepatitis and cirrhosis, while SACHT determination may aid in ruling out active duodenal ulcer.

2616 TREATMENT OF PARALYTIC ILEUS WITH ADRENERGIC NEURONAL BLOCKING DRUGS. (E.) Heimbach, D. M. (Western Infirm., Glasgow, Scotland) and J, R. Crout. *Surgery* 69(4):582-587, 1971.

Twenty patients undergoing routine abdominal operations without bowel anastomoses were assigned to 1 of 2 treatment groups in a double-blind study on the first postoperative day. One group received 30 mg i.v. of bethanidine sulfate, (a guanethidine analogue) over 40 min; the second group received saline placebo; 1 hr later, incremental doses (0.05 mg i.v.) of neostigmine were given to all patients until flatus was passed or abdominal cramping occurred. Persistent bowel sounds and tolerance of oral feedings by the following day was termed a success, while disappearance of bowel sounds and the continued need for nasogastric suction was termed a failure. Although all patients developed evanescent bowel sounds after neostigmine, there was no difference in success rate between those who received bethanidine and their saline-treated controls.

2617 ALCOHOL BLOCK OF THE CELIAC PLEXUS FOR CONTROL OF UPPER ABDOMINAL PAIN CAUSED BY CANCER AND PANCREATITIS. TECHNICAL NOTE. (E.) Gorbitz, C. (U. Texas M. D. Anderson Hosp. Tumor Inst., Houston) and M. E. Leavens. *J. Neurosurg.* 34(4):575-579, 1971.

If it is neurologically clear that upper abdominal visceral pain is the sole or primary pain problem, an alcohol block of the celiac plexus is advised. This technique has the advantage that a single placement of catheters under X-ray control can be used for both the diagnostic and the alcohol celiac plexus blocks. Results from using this technique on 6 patients with carcinoma of the pancreas, 1 with carcinoma of the bile duct, 1 with colonic cancer and 1 with lung cancer with liver metastases, ranged from complete relief of abdominal and back pain to 50% relief of pain for 1 month between administration of the block and death. Two main complications seen after celiac alcohol block are pain and postural hypotension. X-ray control and aspiration of the catheter are the 2 safeguards used in placing the catheter in an optimal and safe position on the anterior and lateral aspect of the first lumbar vertebral body. Suffering during the time of the alcohol injection can be eliminated by the administration of droperidol with fentanyl.

2618 PANCREATITIS, MALABSORPTION, AND IgA DEFICIENCY IN A CHILD WITH DIABETES. (E.) Penny, R. (Sinai Hosp., Baltimore, Md.), R. G. Thompson, S. H. Polmar and R. B. Schultz. *J. Pediatr.* 78(3):512-519, 1971.

The unique occurrence of pancreatitis, malabsorption, and IgA deficiency in a Caucasian child with juvenile diabetes is reported. Diabetes was diagnosed at 2 1/2 yr of age, malabsorption and pancreatitis 1 yr later. Duodenal biopsy revealed atrophic mucosa. The patient gained weight on pancreatin (discontinued after 2 months) and a gluten-free diet over the next yr. The IgA levels did not revert to normal.

2619 BILATERAL DIAPHRAGMATIC HERNIA FROM BLUNT INJURY CAUSING A BUDD-CHIARI SYNDROME: USE OF LIVER AND SPLEEN SCAN IN DEMONSTRATING THE DEFECTS. (E.) Clay, M. G. (Vancouver Gen. Hosp., British Columbia, Canada) and A. I. Munro. *Ann. Surg.* 173(2):321-324, 1971.

A case history of a 21 yr old man with bilateral traumatic diaphragmatic hernias which produced symptoms 3.5 months after injury, is reported. The patient had rotation of the liver and ascites manifesting as right pleural effusion. He also had abdominal pain and vomiting, which might be explained by the left diaphragmatic hernia. Immediately after surgical repair of the hernia, the patient developed severe hypovolemia from rapid formation of ascites, likely caused by congestion of the liver related to its increased torsion. Most of the symptoms described were characteristics of the Budd-Chiari syndrome. When the liver was returned to its normal position no further ascitic fluid formation occurred. Radioactive scanning with technetium 99 m sulfur colloid was performed, technetium rather than gold being used because it outlined both the liver and the displaced spleen.

2620 PANCREATIC HYPERSECRETION IN THE ZOLLINGER-ELLISON SYNDROME. CASE REPORT. (E.) Dyck, W. P. (Scott and White Mem. Hosp., Temple, Tex.). *Gastroenterology* 60(1): 90-95, 1971.

A 54 yr old man with the Zollinger-Ellison syndrome demonstrated unusually high basal pancreatic secretion of fluid and bicarbonate equal to the mean secretory values of a group of control subjects during maximum secretin stimulation. Following exogenous secretin stimulation, fluid and bicarbonate values in this patient were 200% those of controls. The pancreatic capacity for bicarbonate secretion was found to match the gastric secretory capacity for hydrogen ion. It is thought that the release of endogenous secretin may be responsible for the high level of basal pancreatic secretion. A functional hypertrophy of the exocrine pancreas may explain the hypersecretion of fluid and bicarbonate following stimulation with exogenous secretin and the absence of clinically apparent malabsorption. The apparent mucosal damage in the duodenum and jejunum of this patient (marked thickening with areas of mild dilation and increased fluid) in the absence of grossly evident steatorrhea suggests that mucosal cell integrity may be more vulnerable to moderate changes in pH than are intraluminal digestive processes.

2621 INTRACISTERNAL GRANULES IN THE HUMAN PANCREAS. (E.) Brown, R. E. (Med. Coll. Virginia, Richmond) and P. F. Schatzki. *Arch. Pathol.* 91(4):351-352, 1971.

A single case is reported of a 42-yr-old Negro male with the clinical diagnosis of Zollinger-Ellison syndrome. Light microscopy revealed pancreatic islet hypertrophy, neoformation of islets from ductal elements and mild to moderate degrees of centroacinar and intercalated duct cell proliferation. Electron microscopy revealed that some of this patient's pancreatic acinar cells had intracisternal granules similar to those seen in the guinea pig, cat and dog. The acinar cells containing these granules appeared intact and devoid of any evidence of cellular degeneration.

2622 BLOOD FLOW AND GASTROINTESTINAL DISEASES. (E.) Bynum, T. E. (U. Oklahoma Med. Ctr., Oklahoma City) and E. D. Jacobson. *Digestion* 4(2):109-116, 1971.

2623 GASTRO-INTESTINAL BLEEDING DUE TO ARTERIO-ENTERIC FISTULA. (E.) Schramek, A. (Rambam Govt. Hosp., Haifa, Israel), G. M. Weisz and D. Erlik. *Digestion* 4(2):103-108, 1971.

2624 SEQUENTIAL GASTROINTESTINAL COMPLICATIONS OF POLYARTERITIS NODOSA. (E.) Painter, R. W. (Hartford Hosp., Conn.). *Am. J. Gastroenterol.* 55(4):383-386, 1971.

2625 PARALYTIC ILEUS CAUSED BY ORTHNER'S DISEASE OR ABDOMINAL ANGINA. (Ger.) Flex, G. (Karl Marx U. Surg. Clin., Leipzig, Germany), H.-D. Czarnetzki and W. Hartig. *Zentralbl. Chir.* 96(16):548-552, 1971.

2626 A UNIFIED CONCEPT OF THE VASCULAR PATHOGENESIS OF ENTEROCOLITIS OF VARIED ETIOLOGY. A PATHOPHYSIOLOGIC ANALYSIS. (E.) Allen, A. C. (State U. New York Downstate Med. Ctr., Brooklyn). *Am. J. Gastroenterol.* 55(4):347-378, 1971.

2627 IRON ABSORPTION AND PYREXIA. (E.) Beresford, C. H. (South West Reg. Transfus. Ctr., Bristol, England), R. J. Neale and O. G. Brooks. *Lancet* 1(7699):568-572, 1971.

2628 THYROID HORMONES AND THE GUT. (E.) Middleton, W. R. J. (Roy. Prince Alfred Hosp., Sydney, Australia). *Gut* 12(2):172-177, 1971.

2629 STUDY OF BICARBONATE TITRATION DURING CONGENITAL CHLORIDE DIARRHEA. (Fr.) Dumas, R. (St. Charles Clin. Montpellier, France), F. Remediani, H. Bonnet and R. Jean. *Arch. Fr. Pediatr.* 27(9):979-989, 1970.

2630 THE ACUTE ABDOMEN IN THE AGED. (E.) Hossack, D. W. (43 Spring St., Melbourne, Australia). *Ann. Gen. Pract.* 15(6):211-214, 1970.

2631 GASTROENTEROLOGICAL PROBLEMS OF THE AGED. (E.) Hillman, H. S. (14 Collins St., Melbourne, Australia). *Ann. Gen. Pract.* 15(6):209-210, 1970.

2632 POSTOPERATIVE IMMEASURABLE FLUID LOSSES IN RELATION TO THE EXTENT OF THE OPERATIVE PROCEDURE IN GASTROINTESTINAL SURGERY. (E.) Christiansen, J. (Finsen Inst., Copenhagen). *Acta Chir. Scand.* 136(5):419-422, 1970.

2633 CHANGES IN IMMUNOLOGICAL INDICES DURING FORMATION OF A CARRIER STATE IN SALMONELLOSIS. (Rus.) Bunin, K. V. and L. I. Shuba. *Zh. Mikrob. Epidemiol. Immunobiol.* 47(10): 46-52, 1970.

2634 FUNCTIONAL MORPHOLOGICAL CHANGES OF THE DUODENUM AND SMALL INTESTINE IN DISEASES OF THE GASTROINTESTINAL TRACT. (Rus.) Gubergrits, A. I., I. V. Linevski and V. N. Shmakov. *Ter. Arkh.* 42(12):18-24, 1970.

2635 CLINICAL EXPERIENCES WITH THE USE OF CARMINAGAL (CYMARIN), A NEW CARMINATIVE PREPARATION. (Ger.) Muller, H. (City Hosp., Munich-Harlaching, Germany). *Z. Allgemeinmed.* 47(3):133-135, 1971.

2636 INTESTINAL SEGMENTS AND POUCHES IN GASTROINTESTINAL SURGERY. (E.) Winchester, D. P. (Evanston Hosp., Ill.) and J. M. Dorsey. *Surg. Gynecol. Obstet.* 132(1): 131-147, 1971.

2637 N-ACETYLETHYL-2-CIS-CROTONYL CARBAMIDE AS ADJUNCT TO CLASSIC THERAPIES IN GASTROINTESTINAL DISORDERS. (Fr.) Barek, J. *Ouest Med.* 24(3):241-243, 1971.

2638 TROPICAL DIARRHEA IN VIETNAM. A CONTROLLED STUDY OF CHOLESTYRAMINE THERAPY. (E.) McCloy, R. M. (Eighth Field Hosp., Nha Trang, Vietnam) and A. F. Hofmann. *N. Engl. J. Med.* 284(3):139-140, 1971.

2639 EXPERIENCES WITH A NEW ANTIDIARRHEAL PREPARATION IN GENERAL PRACTICE. (Ger.) Metzger, C. (Keferstr. 20, Munich, Germany). *Med. Monatsschr.* 25(1):39-40, 1971.

2640 CERULEIN TREATMENT FOR PARALYTIC ILEUS. (E.) Agosti, A. (U. Parma Inst. Pharmacol., Italy), G. Bertaccini, R. Paulucci and E. Zanella. *Lancet* 1(7695):395, 1971.

2641 MYENTERIC PLEXUS IN HYPERTROPHIED INTESTINE. (E.) Okada, A. (Univ. Med. Sch., Osaka, Japan) and E. Okamoto. *J. Neurovisc. Relat.* 32(2):75-89, 1971.

2642 EFFECT OF A NEW NEUROSEDATIVE AND ANTISPASMODIC COMPOSITE PREPARATION IN GASTROINTESTINAL DISEASES. (Fr.) Chabanon, R. (Red Cross Hosp., Lyon, France), R. Dietsch and B. Savoye. *J. Med. Lyon* 52(1200):63-64, 1971.

2643 ETIOLOGIC STRUCTURE OF ACUTE INTESTINAL INFECTIONS IN ADULTS. (Rus.) Tarasov, V. I., L. I. Gorobetz and N. V. Pikel. *Zh. Mikrobiol. Epidemiol. Immunobiol.* (10):89-94, 1970.

2644 INFECTIOUS DIARRHEA IN ACHLORHYDRIC SUBJECTS. RESULTS OF ANTIBIOTIC THERAPY. (Fr.) Levrat, M. (Edouard Herriot Hosp., Lyon, France), R. Truchot and A. Moulin. *Arch. Fr. Mal. App. Dig.* 60(1-2):57, 1971.

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2646 NEOPLASTIC ARGENTAFFIN CELLS IN GASTRIC AND INTESTINAL CARCINOMAS. (E.) Kubo, T. (Kyushu U. Cancer Res. Inst., Fukuoka, Japan) and H. Watanabe. *Cancer* 27(2):447-454, 1971.

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2648 DETERMINATION OF THE ANTIGENS OF GASTROINTESTINAL TUMORS BY GEL PRECIPITATION. (Rus.) Korolj, T. M. (P. A. Gertsen Res. Inst. Oncol., Moscow), B. E. Chechik and V. I. Rogalski. *Vopr. Onkol.* 16(9):45-48, 1970.

2649 VITAMIN E DEFICIENCY IN A CHILD WITH INTESTINAL LYMPHANGIECTASIA. (E.) Higashi, O. (Univ. Sch. Med., Akita, Japan), T. Fujiwara and T. Arakawa. *Tohoku J. Exp. Med.* 102(2):169-178, 1970.

2650 HEMATOLOGIC STUDIES OF SEVERE UNDERNUTRITION OF INFANCY. III. ERYTHROCYTE SURVIVAL IN MARASMIC INFANTS AND CALORIE DEPRIVED PIGS. (E.) Stekel, A. (U. Washington Sch. Med., Seattle) and N. J. Smith. *Am. J. Clin. Nutr.* 23(7):896-904, 1970.

2651 CAUSES OF CHRONIC DIARRHEA IN INFANTS AND CHILDREN. (E.) Poley, J. R. (U. Oklahoma Med. Ctr., Oklahoma City). *Postgrad. Med.* 48(6):143-147, 1970.

2652 BLOOD SELENIUM IN THAI CHILDREN WITH PROTEIN CALORIE MALNUTRITION. (E.) Levine, R. J. (Chiang Mai Med. Coll., Thailand) and R. E. Olson. *Proc. Soc. Exp. Biol. Med.* 134(4):1030-1034, 1970.

2653 GASTROINTESTINAL DISTURBANCES IN POLYMYOSITIS. (Pol.) Jedlinski, J. (Med. Acad. Neurol. Clin., Cracow, Poland) and H. Koniar-Danilewicz. *Przegl. Lek.* 26, Pt. 2(10):781-782, 1970.

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PARASITOLOGY

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Subjects consisted of 40 patients with intestinal amebiasis who had single or multiple amebic granulomas of the cecum and 20 patients with adenocarcinoma of the colon, all of whom were followed for 3-8 years. Of the 40 with amebiasis, 23 had multiple granulomas of the cecum, transverse colon and sigmoid while 17 had cecal involvement only. Of these 40, 1 had coexistent adenocarcinoma of the colon when the study began, while the remaining 6 developed this malignancy 1-4 years after initiation of the study. Medical management (emetine, chloroquine, diiodochlorohydroxyquinoline for 2-12 months) sufficed in 31, while 9 required surgery. All 20 with adenocarcinoma of the cecum had previously been treated for amebic granuloma, and all were treated surgically. Survival was less than 1 year after surgery for 4 patients with large tumors of the Dukes' III type and 3 years or longer in the rest. Both groups had similar symptoms consisting of anemia, anorexia, malaise, weight loss and occult blood in the stools while those with multiple lesions also had loose stools with mucus, tenesmus and abdominal colic. In 18 of those with adenocarcinoma, the tumors could be palpated in the right lower quadrant.

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VOLUME 6, NO. 4
2701 — 3600

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A monthly publication of the

National Institute of Arthritis and Metabolic Diseases

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available citations of all current papers relevant to this field from medical journals published throughout the world. Approximately one-third of the citations dealing with the major aspects of gastroenterology have accompanying abstracts.

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

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NOTE

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	min	minute(s)
ADP	adenosine diphosphate	ml	milliliter(s)
AMP	adenosine monophosphate	mm	millimeter(s)
ATP	adenosine triphosphate	MTD	maximum tolerated dose
BSP	sulfobromophthalein	NAP	nicotanamide adenine dinucleotide
C	degrees centigrade	NADH	reduced nicotinamide adenine dinucleotide
cm	centimeter(s)	NADP	nicotinamide adenine dinucleotide phosphate
CNS	central nervous system	NADPH	reduced nicotinamide adenine dinucleotide phosphate
cpm	counts per minute		
DNA	deoxyribonucleic acid	ng	nanogram (10^{-9})
e.g.	for example	pg	picogram (10^{-12})
g	gram(s)	p.o.	orally
μg	microgram(s)	ppm	parts per million
hr	hour(s)	r	Roentgen
i.m.	intramuscular	RBC	red blood cells (erythrocytes), red blood count
i.p.	intraperitoneal		
IU	international unit(s)	resp.	respectively
i.v.	intravenous	Rev.	review (only in citations)
kg	kilogram(s)	RNA	ribonucleic acid
LD_{50}	median lethal dose(s)	s.c.	subcutaneous
LDH	lactic acid dehydrogenase	sec	second(s)
m	meter(s)	SGOT	serum glutamic-oxalacetic transaminase
M	molar	SGPT	serum glutamic-pyruvic transaminase
mEq	milliequivalent(s)	U	unit(s)
mM	millimolar	UV	ultraviolet
μM	micromolar	WBC	white blood cells (leukocytes), white blood count
mC,μC	milli-,microcurie(s)		
mg	milligram(s)	yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

2701 THE NATURE AND LOCATION OF LOWER ESOPHAGEAL RING. (E.) Goyal, R. K., J. L. Bauer and H. M. Spiro (Yale U. Sch. Med., New Haven, Conn.). *N. Engl. J. Med.* 284(21): 1175-1180, 1971.

Two morphologically distinct types of rings that differed in their location in the lower esophagus were demonstrated in autopsied material. The mucosal ring, more frequent than the muscular ring, consisted of a fold of mucosa located at or about the junction of squamous and the columnar epithelium. There was no evidence of inflammatory reaction. The mucosal ring was not associated with hiatus hernia. The muscular ring was composed of thickened circular muscle bundles and was covered on either side by squamous epithelium. The muscular ring, lying proximal to the mucosal ring, corresponds to the fibers that Lerche named the inferior esophageal sphincter. The area distal to the muscular ring is the vestibule, which is the equivalent of the manometric lower high pressure zone.

2702 ELECTRON MICROSCOPE AUTORADIOGRAPHY OF THE MOUSE FUNDIC MUCOSA AFTER INJECTION OF TRITIATED L-DOPA. (E.) Tjälve, H. (U. Uppsala Dept. Toxicol., Sweden). *Experientia* 27(3): 307-309, 1971.

The fundic gland area of the mouse stomach was examined using electron microscope autoradiography to establish in which cells monoamine accumulation takes place following i.v. injection of dihydroxyphenylalanine (0.54 mg/kg body weight). There was a strong accumulation of silver grains over 2 types of enterochromaffin cells. The first type had round granules (150-250 millimicrons) in diameter, with a homogeneous appearance, and a rather high electron opacity. The second cell type had 2 kinds of granules: some of them were small (150 millimicrons containing a round or irregular osmophilic body surrounded by a clear space, while others were larger (300-600 millimicrons) and seemed to lack content or contained only a small osmophilic body. Both cell types had a basal location in the epithelium of the deeper parts of the gastric glands without any contact with the gland lumen. Silver grains over zymogen cells or over parietal cells were few and seemed to be without any preferential localization.

2703 LOCALIZATION OF TRITIUM FROM HISTAMINE IN GASTRIC MUCOSA IN VIVO. (E.) Weinshelbaum, E. I. (VA Hosp., Lake City, Fla.) and D. J. Ferguson. *Histochemie* 26(1):9-18, 1971.

Radioautographs of canine stomach showed no radioactivity localization after 4 days exposure to ^{3}H-histamine and an average of 5 foci/mm^2 after 136 days. The radioactively labelled cells corresponded to endocrine-like cells of a distinct kind. These contained small membrane-bound granules, uniformly round in shape with a dense solid-appearing core and a light staining zone between the core and limiting membrane. Other nonradioactively labelled cells were also characterized as endocrine-like cells. Canine endocrine-like cells could be divided into 2 groups (large-prominent heavily stained versus faint granules) on the basis of affinity for Bodian stain. Correlation of radioautographs with adjacent Bodian stained sections under the light microscope showed that the radioactively labelled cells invariably corresponded to faintly granular rather than intensely stained granules. Endocrine-like cells in mouse stomach were also seen to take up radioactivity from histamine in vivo. It is suggested that cells linked morphologically to the enterochromaffin system and the cells of the "amine precursor uptake and decarboxylating" series may serve as a depot for endogenous histamine.

2704 ELECTRON MICROSCOPE STUDY OF MUCOSAL RECONSTITUTION IN ISOLATED GASTRIC POUCHES IN THE RABBIT. I. PERSISTENCE OR PRE-EXISTENCE OF ARGYROPHILIC CELLS. (Fr.) Beauville, M. (Sch. Med. Pharm., Nantes, France), G. Pradal, P. Raynaud and J. Tusques. *C. R. Soc. Biol. (Paris)* 164(7):1633-1635, 1970.

Destruction of old epithelium and regeneration of new epithelium was observed in isolated gastric pouches in rabbits. In the beginning argyrophilic cells were present at all times and did not undergo lysis although all of the epithelium was necrotic and in the process of undergoing phagocytosis. Although the mitochondria of argyrophilic cells became somewhat swollen and unusual lipid droplets were present, other structures in these cells could be recognized without difficulty. These findings conflict with others reported in the literature, but experimental conditions were different.

2705 ULTRASTRUCTURAL CLASSIFICATION OF ENDOCRINE-LIKE CELLS IN THE MUCOSA OF HUMAN STOMACH. (E.) Nabeyama, A. (Okayama U. Med. Sch., Japan), F. Murata, H. Matsuda and T. Ogata. *Tohoku J. Exp. Med.* 103(1):17-47, 1971.

Relatively normal gastric mucosa obtained from young patients with duodenal ulcer or gastric polyp was examined electron microscopically, and the endocrine-like cells classified into 7 types. In type I, the basal region contained electron-dense and polymorphous secretory granules, while the apical end had long microvilli. Type II cells were triangularly shaped and contained round granules which varied in size (300-600 millimicrons) and in electron density. Type III cells were characterized by their triangular shape and small (130 millimicrons), round, electron dense granules which were uniform in size and homogeneous in appearance. The characteristic features of type IV cells included a prominent supranuclear endoplasmic reticulum and Golgi complex, and 2 kinds of basalar granules; small (200 millimicrons) electron opaque ones, and larger (400 millimicrons) pale, foamy ones. Type V cells had their narrow apical part in contact with the glandular lumen and had granules which were uniformly round (300-500 millimicrons) and low in electron density. The most prominent features of type VI cells were pyriform nuclei, and small (90-150 millimicrons) specific granules localized in the infranuclear cytoplasm. Type VII cells were round or spindle-shaped and had very long microvilli at the apical end. The infranuclear cytoplasm contained low electron-dense granules (400-500 millimicrons) while the supranuclear region contained a well-developed Golgi complex and lysosomes.

2706 HISTOLOGICAL CHANGES IN THE GASTRIC MUCOSA OF MAGNESIUM DEFICIENT RATS. (E.) Artizzu, M. (U. Montreal Sch. Med., Quebec, Canada) and B. Messier. *Br. J. Exp. Pathol.* 52(1):70-74, 1971.

Eight days after being started on a magnesium deficient diet, the gastric mucosa of Sprague-Dawley rats exhibited occasional dilatation and engorgement of small vessels, enlargement of gastric pits, and decreased adhesiveness between mucous cells whose mucus content appeared reduced. At 16 days, most of the changes being restricted to the upper third of the mucosa, dilated vessels became tortuous, frequently showing margination, and the number of mucous cells appeared reduced. Extracellular mucus formed a thin discontinuous coating which reacted less intensely to the periodic acid-Schiff reaction. By 45 and 60 days there was a structural disorganization, accompanied by an increased vascularity and a conspicuous reduction of mucous cells. Perivascular fibrosis and swollen parietal cells with pale cytoplasm and a vesicular nucleus were consistently noted. Vascular and cellular changes in the gastric mucosa of magnesium deficient rats may be a result of modified histamine metabolism.

2707 ULTRASTRUCTURAL CHANGES IN THE GASTRIC MUCOSA AFTER TRUNCAL VAGOTOMY. (E.) Halaris, A. E. (Max Planck Inst. Psychiatr., Munich, Germany). *Eur. Surg. Res.* 3(1):13-27, 1971.

Two days after truncal vagotomy, changes in the substructure of the axoplasm of some axons become visible. Cristae and matrix of mitochondria became very electron-dense resembling the beginning of lipid degeneration. Synaptic vesicles are reduced, some being replaced by lipid droplets and fine filaments which represent debris of degenerated vesicles. Three hours after section of the vagus nerve, about 60% of blood capillaries show a marked constriction which persisted until day 14. The initial ischemia caused swelling of the endothelial cells, reduction of the number of pinocytotic vesicles and mitochondrial damage. In the cytoplasm of some parietal cells, vacuoles appear which might be connected to mitochondria, and intracellular canaliculi are in a number of cells collapsed or even dissociated. In the chief cell, the volume of the nucleus is decreased and the nuclear envelope appears detached from the nucleoplasm. Zymogen granules are no longer distinctly separated from each other; they confluate and contain small electron-dense particles. Nerve degeneration causes a cholinergic deficit which is responsible for the clinical effects of vagotomy. Ischemia is apparently the cause of alterations observed in chief and parietal cells, but it does not account for the long-term reduction of functional ability of the gastric mucosa after vagotomy.

2708 ULTRASTRUCTURE OF PEYER'S PATCHES IN THE NORMAL MOUSE. (E.) Chin, K. N. (U. Singapore Dept. Anat.) and G. Hudson. *Acta Anat. (Basel)* 78(2):306-318, 1971.

The cellular content (large and small lymphocytes, reticular cells, plasma cells and blast cells) and ultrastructure in Peyer's patches resembled that in other lymphoid tissues. Within the Peyer's patch, small blood vessels were identified and post-capillary venules showing lymphocytes in transit through their walls were encountered particularly towards the periphery of the patch. On the luminal aspect of the patch, columnar epithelial cells of the intestine were seen to lie upon a basement membrane. Beneath the basement membrane, there was a layer of flattened connective tissue cells with elongated processes. On the abluminal aspect of the Peyer's patch, the dense lymphoid tissue was again separated from the muscular coat of the intestine by an interval of varying size. In this interval, connective tissue cells, macrophages, plasma cells and lymphatic vessels were often prominent as well as bundles of collagenous fibers.

2709 ATTEMPTS TO MODIFY THE INTESTINAL VILLUS ARCHITECTURE IN MICE. (E.) Gibbins, R. L. (St. John's Coll., Cambridge, England) and T. J. John. *J. Pathol.* 103(1): 57-60, 1971.

The role of repeated infections, spicy foods, recurrent diarrhea, and nutritional defects in the causation of abnormal villus architecture of the small intestine was studied in mice. The stimuli applied to the mice were powdered red chili fruit, sterile castor oil, oral viral (Coxsackie B1, B2 and B3 and reovirus types 1, 2 and 3) and bacterial (Escherichia coli, Shigella flexneri, and Salmonella type C12) innoculations, and a deficient diet consisting of boiled polished rice. At no time in the 12-week experimental period did any experimental mice show changes in the villus architecture of the duodenum, jejunum, or ileum when compared with normal controls.

2710 ELECTRON MICROSCOPIC STUDY OF THE IN VIVO EFFECT OF 2-DEOXY-D-GLUCOSE ON THE RAT HEPATOCYTE. (E.) Rosa, F. (Central U. Venezuela Exp. Med. Inst., Caracas). *J. Ultrastruct. Res.* 35(1-2):66-70, 1971.

The effect of 2-deoxy-D-glucose (2-DG; 100 mg/100 g body weight) on the fine structure of the hepatocyte was studied in fasted and fed rats. Mitochondria of uninjected, fasted animals were enlarged and pleomorphic in most cases. Fifteen min after the administration of 2-DG the mitochondria of fasted rats were somewhat enlarged, and at 30 min they were distorted and the density of the matrix showed a slight increase. The size of the mitochondria decreased and pleomorphism disappeared by 45 min after injection, and by 120 min they appeared similar to those of the control group. 2-DG also caused an increase in the number of dense structures (800-1200 Å in diameter) inside the smooth and rough endoplasmic reticulum and the cisterns of the Golgi apparatus of fasted rats. Fifteen min after 2-DG administration in fed rats, there were no significant changes in the mitochondria, however they became slightly enlarged after 30 min. At this time, there was hypertrophy of the smooth endoplasmic reticulum and a progressive decrease in glycogen granules when compared with uninjected controls.

2711 INTRACYTOPLASMIC CANALS FORMED BY PLASMA MEMBRANE INVAGINATIONS IN NORMAL RAT LIVER PARENCHYMAL CELLS. (E.) Oledzka-Slotwinska, H. (St. Rafael Acad. Hosp., Louvain, Belgium) and V. Desmet. *Acta Anat.* 78(1):47-50, 1971.

Deep plasma membrane invaginations similar to those previously described in cholestatic liver cells were observed. The plasma membranes of 2 neighboring hepatocytes were seen to run parallel and closely together. Intracytoplasmic canals or flattened cisternae formed by plasma membrane invagination often contained granules or accumulations of electron-dense material of unknown nature. A continuity between the plasma membrane and that of autophagic vacuoles was also observed. The formation of tubular or cisternal invaginations by the plasma membrane may represent a pinocytotic system as well as a mechanism for discharge of used or damaged organelles, digestion products and secretory substances.

2712 A MORPHOLOGICAL STUDY OF THE DEVELOPMENT OF THE HUMAN LIVER. I. DEVELOPMENT OF THE HEPATIC DIVERTICULUM. (E.) Severn, C. B. (U. Nebraska Coll. Med., Omaha). *Am. J. Anat.* 131(2):133-158, 1971.

The hepatic diverticulum was formed concurrently with the establishment of the gastrointestinal tract and it was established in part by differential growth of the endoderm, in part by differential growth of surrounding structures and in part because of a relatively fixed contact between a segment of the endoderm and the endothelial lining of the heart. The liver primordium was identified in a 5-somite embryo as a flat plate of endodermal cells continuous with and lying ventral to, the foregut endoderm at the anterior intestinal portal. Positioned caudal and ventral to the developing heart, this plate of endoderm subsequently undergoes a progressive folding (U-shaped, then J-shaped). During this folding, cells of the endodermal plate and the caudal and ventral endothelial lining of the atrium and sinus venosus are in a close spatial relationship. The hepatic diverticulum, established by the 20-somite stage embryo, is T-shaped and projects ventrally and cephalically from the gastrointestinal tract.

2713 COMPARTMENTS RICH IN ACIDIC CARBOHYDRATE-PROTEIN COMPLEXES WITHIN ELECTROLYTE- AND WATER-TRANSPORTING CELLS. (E.) Weinstock, M. (Harvard U. Biol. Labs., Cambridge, Mass.) and M. A. Bonneville. *Lab. Invest.* 24(5):355-367, 1971.

The distribution, size, and staining properties of vesicles which are found in the apical cytoplasm and terminal web regions of absorptive cells of the ascending mouse colon and rabbit gallbladder epithelium were studied electron microscopically. Two types of vesicles were observed: smaller densely staining ones (120-180 millimicrons in diameter) and larger ones (210-260 millimicrons) which were lighter in color and had frequent interruptions in their limiting membrane resulting in C-shaped profiles. Transitional forms were also found suggesting that they are 2 states of the same basic structure. The dimensions and staining properties of the observed vesicles resembled those of the microvilli at the free surface of the absorptive cells. Both the surface coat material and the morphologically similar content of the vesicles stained with positively charged colloidal thorium, indicated that both contain acidic carbohydrate-protein complexes. The vesicles seem to originate from the Golgi complex as suggested by the frequency with which they are found in this region of the cell. These vesicles seemingly enclose an intracellular compartment that represents an internalized expansion of the luminal cell surface.

2714 THE AGE OF APPEARANCE OF THE HAUSTRA OF THE HUMAN COLON. (E.) Pace, J. L. (Roy. U. Malta Dept. Anat.). *J. Anat.* 109(1): 75-80, 1971.

Examination with both the dissecting microscope and histological section revealed the appearance of haustra in the human colon between weeks 10-11 of fetal life. Thereafter the haustral clefts became deeper and more marked. Haustral cleft formation, including the presence of a blood vessel within the cleft and an augmentation of the circular muscle layer at that site were observed at the 75 mm Crown-Rump stage. The taenia coli, whose function has been linked with the formation of haustral clefts also appeared between weeks 10-11 (50 and 60 mm Crown-Rump stage).

2715 EARLY CHANGES IN THE EXOCRINE PANCREAS OF THE DOG AND RAT AFTER LIGATION OF THE PANCREATIC DUCT. A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Churg, A. (U. Chicago Dept. Pathol., Ill.) and W. R. Richter. *Am. J. Pathol.* 63(3):521-546, 1971.

The general pattern of pancreatic changes observed following pancreatic duct ligation in both rats and dogs included acinar cell atrophy, dilatation of acini and ducts and replacement of most of the exocrine pancreas by fibrous tissue. There was marked variability in the lesion, with more rapid progression occurring closer to the point of ligation. Within 48 hr acinar cells showed decreased zymogen granules, the rough endoplasmic reticulum was broken down into short segments and rings and the Golgi apparatus showed a deposition of dense material. Filamentous bodies of uncertain origin, appearing as either fused dense areas or with a matrix of low density, were also found in both species. Ductal cells showed increased rough endoplasmic reticulum and free ribosomes as well as enlarged Golgi apparatus. These cells resembled dedifferentiated acinar cells. Apparently cellular responses to duct ligation are cell destruction and/or changes into another morphologic type. Ductular secretion is seemingly important in the production of dilated ducts and significant differences exist between the changes occurring after duct ligation and those in cystic fibrosis.

2716 CELLULAR LOCALIZATION OF GASTRIN IN THE HUMAN PANCREAS. (E.) Greider, M. H. (Washington U. Sch. Med., St. Louis, Mo.) and J. E. McGuigan. *Diabetes* 20(6):389-396, 1971.

Cellular localization of gastrin in the pancreas was attempted using fluorescein-labelled antibodies to human gastrin I to stain sections of human pancreas taken at autopsy. Islets of pancreatic tissue contained a small population of cells which exhibited yellow-green fluorescence localized entirely in the cytoplasm. The fluorescent cells were not restricted to any particular area of the islet, and varied from 1 or several, to 10 or more, per large islet. The islet cells which exhibited specific flourescence with flourescein-labelled antibodies to gastrin I were stained with the Hellerstrom-Hellman argyrophilic procedure indicating that these cells are delta cells. Using gastrin radioimmunoassay it was also possible to identify the presence of immunoreactive gastrin in pancreatic extracts. Controls for immunofluorescent specificity indicated no cross reaction with cholecystokinin-pancreozymin.

2717 EXFOLIATIVE CYTOLOGY OF THE OESOPHAGUS. (E.) Vilardell, F. (Santa Cruz y San Pablo Hosp., Barcelona, Spain). *Digestion* 4(1): 59-63, 1971.

2718 THE ULTRASTRUCTURE OF THE ESOPHAGEAL MUCOSA. (Ger.) Themann, H. (Univ. Inst. Phys. Med., Munster, Germany), R. Ottenjann, R. Roggel and S. E. Miederer. *Z. Gastroenterol.* 9(3):171-184, 1971.

2719 GASTRIC CYTOLOGY: PERSONAL EXPERIENCE. (Sp.) Zaragosi Moliner, J. (Valencia, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(5): 589-596, 1971.

2720 THE STRUCTURE OF THE INTRAGLANDULAR VESSELS OF THE HUMAN PANCREAS. (Ger.) Krutikowa, I. F. (Leningrad Med. Inst. Health., USSR). *Anat. Anz.* 127(2):189-199, 1970.

2721 ULTRASTRUCTURE OF GLYCEROL-EXTRACTED SMALL INTESTINE MUSCLE CELLS OF THE RAT BEFORE AND AFTER CONTRACTION. (Ger.) Graf-Keyserlingk, D. (Free U. Berlin 2nd Anat. Inst., Germany). *Z. Zellforsch. Mikrosk. Anat.* 111(4):559-571, 1970.

2722 MORPHOLOGICAL AND BIOCHEMICAL STUDIES OF LIVER CELLS IN CELLULAR CULTURE: OBTAINING A CLONE OF RAT HEPATOCYTES. Lambiotte, M. (Inst. Molec. Biol., Paris). *Ann. Biol. (Paris)* 9(5-6):349-356, 1970.

2723 ELECTRON MICROSCOPIC STUDY OF RAT LIVER CHANGES FOLLOWING INJECTION OF ANTINECROTIC RAT LIVER RABBIT SERUM. (Jap.) Kato, O. (Jikei U. Sch. Med., Tokyo). *Tokyo Jikeikai Ikadaigaku Zasshi (Tokyo Jikeikai Med. J.)* 85(4):439-456, 1970.

2724 RIBOSOME MEMBRANE RELATIONSHIP AND RIBOSOMAL SUBSTRUCTURES IN NORMAL RAT LIVER CELLS. (Ger.) David, H. (Humboldt U. Inst. Pathol., Berlin) and I. Uerlings. *Acta Biol. Med. Germ.* 25(2):343-350, 1970.

2725 LYSOSOMES AND GLYCOGEN IN THE HEPATIC CELLS. (Fr.) Thys, O. (Free U. Brussels Sch. Med., Belgium). *J. Microsc.* 9(7): 899-906, 1970.

2726 ULTRASTRUCTURAL MORPHOMETRIC ANALYSIS OF THE RAT LIVER CELL IN THE PERINATAL PERIOD. (Ger.) Rohr, H. P. (U. Basel Inst. Pathol., Switzerland) and A. Wirz. *Verh. Dtsch. Ges* 54:505-510, 1970.

2727 MORPHOLOGY OF THE LIVER AND SKELETAL MUSCLES DURING HYPOKINESIA AND PROTEIN DEFICIENCY. (Rus.) Bikov, G. P., A. V. Novikova and S. M. Ivanova. *Kosm. Biol. Med. (Mosk.)* 4(5):80-81, 1970.

2728 THE CAPILLARIES OF THE GALLBLADDER MUCOSA IN THE DOG. (Ger.) Lang, J. (Anat. Inst., U. Inst. Anat., Wurzburg, Germany). *Acta Anat. (Basel)* 75(4):566-577, 1970.

2729 A NONCHOLINERGIC EXCITATORY NERVE PATHWAY IN GUINEA PIG COLON. (E.) Bennett, A. (King's Coll. Hosp. Med. Sch., London) and B. Fleshler. *Am. J. Dig. Dis.* 16(6):550-551, 1971.

2730 ANATOMY AND TOPOGRAPHY OF THE SUBDIAPHRAGMATIC SEGMENTS OF THE VAGUS TRUNKS IN THE CAT. (Pol.) Lewicki, K. (Med. Acad. 3rd Surg. Clin., Gdansk, Poland). *Folia Morphol. (Warsz.)* 30(1):93-96, 1971.

2731 DEVELOPMENT OF ORGAN SPECIFIC HETEROCHROMATIN IN MOUSE LIVER AND PANCREAS. (Ger.) Muller, H. A. (U. Wurzburg Inst. Pathol., Germany). *Verh. Dtsch. Ges. Pathol.* 54:480-486, 1970.

See also numbers: 2741, 2765, 2817, 2820, 2821, 2837, 2846, 2895, 2898, 2910, 2913, 2987, 3049, 3050, 3052, 3346

2732 THE MECHANISM OF CATION PERMEATION IN RABBIT GALLBLADDER. CONDUCTANCES, THE CURRENT-VOLTAGE RELATION, THE CONCENTRATION DEPENDENCE OF ANION-CATION DISCRIMINATION, AND THE CALCIUM COMPETITION EFFECT. (E.) Wright, E. M. (California Med. Ctr., Los Angeles), P. H. Barry and J. M. Diamond. *J. Membrane Biol.* 4(4): 331-357, 1971.

Over a salt concentration range of at least 25-400 mM, the following 3 properties hold: conductance was a linear function of concentration; there was a finite permeability to both anions and cations; and the anion/cation permeability ratio increased only slightly with concentration. These results indicate that the cation permeation mechanism in the gallbladder is not the same as that in a homogenous, macroscopic, hydratable ion-exchange membrane, whether with fixed or mobile sites. The current-voltage relation in the gallbladder (undamaged by potentials of at least 800 mV) suggests that the membrane controlling permeation is sufficiently thick for microscopic electroneutrality to have to be obeyed, and that cation permeation does not involve mobile ion-exchange sites and is not limited by an interfacial resistance. Ca^{++} reduced alkali chloride single-salt dilution potentials, the magnitude of the effect being interpreted as an inverse measure of cation equilibrium constants. Equilibrium selectivity is more important than mobility selectivity.

2733 THE MECHANISM OF CATION PERMEATION IN RABBIT GALLBLADDER. DILUTION POTENTIALS AND BIIONIC POTENTIALS. (E.) Barry, P. H. (U. California Med. Ctr., Los Angeles), J. M. Diamond and E. M. Wright. *J. Membrane Biol.* 4(4):358-394, 1971.

Passive ion permeation in rabbit gallbladder was investigated by single salt dilution potentials as a function of concentration gradient; comparison of dilution potentials for different alkali chlorides; comparison of biionic potentials for different alkali chlorides; and biionic mixture potentials as a function of cation concentration gradient. The permeability sequence obtained from both dilution potentials and biionic potentials was K^+, Rb^+, Na^+, Li^+, and Cs^+ in decreasing order. This sequence is consistent with simple considerations of ion site interactions and ion hydration energies. Construction of empirical selectivity isotherms for alkali cation permeation in epithelia showed that permeability ratios were nearer 1 in the gallbladder and other epithelia than in most other biological membranes, indicating a relatively hydrated permeation route. Cations permeate gallbladder epithelium seemingly via channels with fixed neutral sites. The rate-controlling membrane is thick enough that microscopic electroneutrality must be obeyed and essentially all anion conductance is in a shunt which develops with time after dissection. Apparent permeability changes with solution composition were due to the nonideal activity factor in being less than 1. The permeation route may reside in the tight junctions.

2734 STUDIES ON THE ELECTRICAL POTENTIAL PROFILE ACROSS RABBIT ILEUM. EFFECTS OF SUGARS AND AMINO ACIDS ON TRANSMURAL AND TRANSMUCOSAL ELECTRICAL POTENTIAL DIFFERENCES. (E.) Rose, R. C. (U. Pittsburgh Sch. Med., Pa.) and S. G. Schultz. *J. Gen. Physiol.* 57(6): 639-663, 1971.

The electrical potential difference across the brush border of isolated strips of rabbit ileum mucosa bathed in physiological electrolyte solution averaged 36 mV (cell interior negative). While rapid replacement of Na in the mucosal solution with less permeant anions, Tris or choline resulted im a significant hyperpolarization of the potential difference across the brush border, the rapid replacement of choline in mucosal solution with Na resulted in a prompt depolarization; thus Na conductance contributes to the potential difference. The addition of actively transported amino acids (alanine) or sugars (glucose) to the mucosal solution resulted in a significant depolarization of the trans-mucosal potential difference (mucosal solution to all interior) and a smaller increase in the transmural potential difference. The above was not observed for D-valine, mannitol, or fructose influxes across the brush membrane are independent of Na; therefore Na influx that is coupled to the influxes of amino acids and sugars is apparently electrogenic and responsible for the depolarization of transmural potential difference.

2735 ASSOCIATION OF GOLGI MEMBRANES WITH LIPID DROPLETS (PRE-CHYLOMICRONS) FROM WITHIN INTESTINAL EPITHELIAL CELLS DURING ABSORPTION OF FAT. (E.) Redgrave, T. G. (Australian Natl. U. Curtin Sch. Med., Canberra). *Aust. J. Exp. Biol. Med. Sci.* 49(2):209-224, 1971.

Following a fatty meal, intracellular lipid droplets (pre-chylomicrons) were isolated from rat small intestinal epithelial cells. The intracellular lipid contained more protein and less phospholipid than chylomicrons, but in both kinds of particle the major lipid was triglyceride. Pre-chylomicrons also contained more unesterified fatty acid than chylomicrons. The phospholipids of pre-chylomicrons had a class composition different from chylomicron phospholipid which was predominantly (80%) phosphatidyl choline. Radioactive galactose, shown previously to become concentrated in the Golgi apparatus of intestinal mucosal cells, was concentrated in the pre-chylomicron fraction. Thin sections of embedded material confirmed the presence of membranaceous material enveloping the pre-chylomicrons. This surface membrane showed the same reaction to a selective osmium impregnation technique as the Golgi apparatus. The Golgi apparatus may be involved with transport of fat particles out of the absorptive cell to form chylomicrons in intestinal lymph.

2736 ION TRANSPORT IN RABBIT ILEAL MUCOSA. I. Na AND Cl FLUXES AND SHORT-CIRCUIT CURRENT. (E.) Field, M. (Harvard Med. Sch., Boston, Mass.), D. Fromm and I. McColl. *Am. J. Physiol.* 220(5):1388-1396, 1971.

Ion transport in rabbit ileal mucosa was examined in vitro by measuring ^{22}Na, ^{24}Na, and ^{36}Cl fluxes across short-circuited ileum, stripped of muscularis. The stripped preparation, when compared to the unstripped, had a higher and more stable short-circuit current and a greater short-circuit current response to D-glucose. Both Na and Cl were actively absorbed in rabbit ileum. The active transport of neither ion could have resulted exclusively from an electrically neutral process. The residual ion flux probably resulted from the active secretion of HCO_3 (or an equivalent process causing luminal alkalinization).

2737 IN SITU STUDIES OF CALCIUM ABSORPTION IN RATS. (E.) Zornitzer, A. E. (U. Louisville Sch. Med., Ky.) and F. Bronner. *Am. J. Physiol.* 220(5):1261-1266, 1971.

The fact that absorption as measured by the in situ intestinal loop method in rats is a linear function of the Ca concentration between 12.5 and 162.5 mM indicates that over this range Ca absorption is not saturated. This was true regardless of age or prior Ca intake. Moreover, the slopes of the lines described by the regression equations were similar, ranging from 0.21 to 0.28. Consequently, all rat groups studied responded to an increase in their gastrointestinal Ca concentration by about the same relative increase in absorption. The difference in absolute absorption was due to a difference in apparent intercept; younger animals and those on a low Ca diet had a greater absorption of Ca. Apparently, Ca absorption involves 2 processes: a saturable active component and a nonsaturable diffusional one; the apparent intercept can be related to the former and the linear portion to the latter. The relative importance of active transport for total Ca absorption thus varies inversely with age or prior Ca intake.

2738 UPTAKE OF ALPHA-METHYLGLUCOSIDE BY NORMAL AND DIABETIC HUMAN JEJUNAL MUCOSA. (E.) Genel, M. (Child. Hosp. Philadelphia, Pa.), D. London, P. G. Holtzapple and S. Segal. *J. Lab. Clin. Med.* 77(5):743-750, 1971.

The uptake of alpha-methylglucoside (α-MG), a non-metabolized glucose analogue, was studied in vitro using peroral jejunal biopsy material obtained following an overnight fast and insulin deprivation from 7 normal controls and 5 patients with juvenile onset diabetes mellitus. Over a prolonged incubation period, the uptake and kinetic characteristics of α-MG were identical in both normal and diabetic patients. α-MG was rapidly accumulated against a concentration gradient in a linear fashion during the first 30 min of incubation after which a steady-state was reached. The glucose-galactose transport system appeared to have a higher affinity and lower capacity for the α-MG analogue. The effect of diabetes on intestinal transport seems to require a duration of time, suggesting the involvement of a metabolic alteration.

2739 EFFECT OF A RIBOFLAVIN DEFICIENCY ON INTESTINAL ABSORPTION OF ESSENTIAL AMINO ACIDS. (Fr.) Wellers, G. (Sch. Med., Paris), N. Galent and J. Chevan. *C. R. Soc. Biol. (Paris)* 164(6):1195-1197, 1970.

In adult rats maintained for 4 weeks on a diet deficient in vitamin B_2, intestinal absorption of all amino acids with the exception of tryptophan was more rapid than in normal controls. Increased rates of absorption were particularly evident for methionine, arginine, and valine. Leucine, threonine, and lysine were not affected as much, but the absorption of histidine, isoleucine, and phenylalanine was still significantly more rapid than in controls. Significant accumulations of arginine and tryptophan were found in the gastrointestinal tract with decreases in the methionine content. Blood arginine and histidine levels were significantly increased. These results are the reverse of those found previously in rats with a vitamin B_1 deficiency: intestinal absorption of amino acids was decreased in these animals.

2740 EVIDENCE IN MAN FOR DIFFERENT SPECIALIZED INTESTINAL TRANSPORT MECHANISMS FOR RIBOFLAVIN AND THIAMIN. (E.) Levy, G. (State U. New York Sch. Pharm., Buffalo) and R. R. Hewitt. *Am. J. Clin. Nutr.* 24(4):401-404, 1971.

The investigation of intestinal transport mechanisms in man revealed large p.o. doses of thiamin and riboflavin to have no effects on the time course of urinary excretion or the total urinary excretion of each other. The concomitant administration of riboflavin and thiamin after a standard breakfast, rather than on an empty stomach, resulted in a statistically significant increase in riboflavin absorption. Thiamin absorption after the meal was delayed and prolonged but total absorption did not differ significantly from that after administering the vitamin on an empty stomach. The absence of any apparent mutual inhibition in the absorption of riboflavin and thiamin in man suggests that these vitamins do not share a common pathway for absorption.

2741 SYNTHESIS AND INTRACELLULAR TRANSPORT OF MACROMOLECULES AND SMALL MOLECULES IN THE LIVER CELL. (E.) Glaumann, H. (Sabbatsberg Hosp., Stockholm, Sweden). *Chem. Biol. Interactions* 3(4):268, 1971.

Albumin was synthesized on bound ribosomes and subsequently transferred to the cavity of rough endoplasmic reticulum, from which it migrates to smooth endoplasmic reticulum and the Golgi apparatus. Pb treatment failed to influence either the synthesis or transport of albumin, as opposed to membrane proteins which showed a significant increase. Pulse labelling experiments with [^{3}H]glycerol into very low density lipoprotein (VLDL), isolated from rough and smooth microsomes and the Golgi apparatus, together with morphological findings indicated that the triglyceride component of VLDL is synthesized in both rough- and smooth-surfaced membranes. This macromolecule seems to be channeled into special, mostly peripheral, portions of the Golgi system. Investigation of [^{14}C]naphthalene (a small molecule known to be metabolized in the endoplasmic reticulum) on its way out of the liver cell shows that these small molecules do not follow the same route of migration (involving the endoplasmic reticulum and the Golgi apparatus) as that of macromolecules.

2742 THE DISTRIBUTION OF CHLORIDE IONS IN THE SMOOTH MUSCLE CELLS OF THE GUINEA-PIG'S TAENIA COLI. (E.) Casteels, R. (U. Louvain Physiol. Lab., Belgium). *J. Physiol. (Lond.)* 214(2):225-243, 1971.

The concentration of intracellular Cl ions in guinea pig smooth muscle taenia coli cells was found to be appreciably higher than that expected for a passive distribution. Perhaps there is a binding of Cl in the intracellular or extracellular compartment or an active uptake of Cl by the cells. However, the hypothesis of Cl binding is not supported by the finding of significantly higher activity coefficients than would be expected for the Cl concentrations in the tissues. The efflux of ^{36}Cl from taenia coli cells was not affected by foreign anions. When Cl was replaced by a slowly penetrating anion, the tissues continued to contain less than 1 millimole of Cl/kg wet weight after 1 hr exposure to a Cl-free solution. The similarity between the effect of ouabain and of K-free solution on the intracellular Cl (decreased concentration) suggests a coupling between the uptake of K and Cl. In K-free solution the Cl permeability of the smooth muscle membrane is enhanced as long as K is leaking out of the cell.

2743 ABSORPTION OF HORSE-RADISH PEROXIDASE BY THE MUCOSAL CELLS OF THE DUODENUM OF MOUSE. II. THE NEWBORN MOUSE. (E.) Hugon, J. S. (U. Sherbrooke Sch. Med., Quebec, Canada). *Histochemie* 26(1):19-27, 1971.

Horse-radish peroxidase was injected i.p. to fasted and fed newborn mice. In fasting newborns (0 day) taken by cesarean section, and in the 2, 4, and 8 day newborns, the dye was present in the mucosal cells at 15, 30 and 90 min. In fed newborn mice 0 or 2 days old, no activity of injected peroxidase was observed in the mucosa while in 4 or 8 day fed newborns, the appearance of the tracer seemed delayed until 30 min and the reaction intensity was weak. In 8-day newborns injected with perioxidase p.o., this portion was observed on the external leaflet of the microvilli membrane of the columnar cells, and in the deep invaginations of the apical membrane. Apparently the tracer injected into the intestinal lumen is rapidly segregated in the apical endocytic complex of the absorptive cells without apparent excretion to the vascular bed.

2744 EFFECT OF INTRAGASTRIC BILE SALTS ON IONIC MOVEMENT ACROSS NORMAL HUMAN GASTRIC MUCOSA AFTER INTRAVENOUS ATROPINE. (E.) Ivey, K. J. (Roy. Prince Alfred Hosp., Sydney, Australia), L. Denbesten and J. A. Clifton. *Gut* 12(4):257-261, 1971.

The effect of atropine (2.0 mg/70 kg i.v.) and intragastric bile salts (5.0-5.5 mM) on ionic fluxes across the gastric mucosa was studied in 8 healthy subjects to test the hypothesis that concurrent gastric secretion of HCl masks the true loss of H^{+} and Cl^{-} from the gastric lumen after bile salt instillations. In the studies with atropine and bile salt mixture, H^{+} and Cl^{-} concentrations and osmolality of gastric contents were significantly decreased and Na^{+} concentrations significantly increased compared to controls. Ionic concentration and flux changes were significantly greater in the first period than the subsequent 3 periods. Instillation of a taurodeoxycholic acid solution after i.v. atropine produced similar though less marked changes in osmolality and H^{+}, Cl^{-}, and Na^{+} ion concentration. K^{+} concentrations were not significantly altered in either study. There was a relatively consistent loss of H^{+} ions in the studies using the atropine and bile salt mixture when the volume secreted was reduced, compared to the marked variation between subjects in control studies. Atropine may have reduced the volume of endogenous HCl secretion unmasking the loss of H^{+}.

2745 CHOLESTEROL ABSORPTION FOLLOWING EIGHTY PER CENT SMALL INTESTINAL RESECTION IN DOGS. (E.) Hochberg, M. S. (Harvard Med. Sch., Boston, Mass.) and H. T. Randall. *RI Med. J.* 54(4):208-210 & 230, 1971.

The effect of resection of 80% of the small intestine on serum cholesterol values and on the rate of cholesterol absorption by the small intestine was studied in 4 puppies (5-10 weeks old) and 4 adult dogs. All 4 puppies died with evidence of malnutrition within 3-6 weeks following resection, but they showed a 15% decrease in serum cholesterol and a 68% decrease in absorption 3 weeks postoperatively. Three weeks postoperatively the total serum cholesterol decrease in the 4 adult dogs was 25%, and the cholesterol absorption rate was decreased by 38%. Six weeks after surgery the rate of absorption diminished by 77%. It seems that this type of resection may succeed in lowering high serum cholesterol levels in patients with a family history of atherosclerosis.

2746 ABSORPTION OF VITAMIN B_{12} IN THE GUINEA-PIG. III. THE FORMS OF VITAMIN B_{12} IN ILEAL MUCOSA AND PORTAL PLASMA IN THE FASTING STATE AND DURING ABSORPTION OF CYANOCOBALAMIN. (E.) Peters, T. J. (Roy. Postgrad Med. Sch., London), J. C. Linnell, D. M. Matthews and A. V. Hoffbrand. *Br. J. Haematol.* 20(3):299-305, 1971.

In the fasting guinea pig, 5'-deoxyadenosylcobalamin was the principal form of vitamin B_{12} detected in ileum, liver and plasma. Only trace amounts of methylcobalamin were found in the liver and ileum but large amounts were found in the plasma. After feeding of labeled cyanocobalamin, a proportion of this analogue was converted to adenosylcobalamin in the ileum; suggesting that the site of interconversion was the mitochondria of the ileal epithelial cells. After a period of mucosal delay, there was a rise in both labeled adenosyl- and labeled cyanocobalamin in portal plasma. Since a significant proportion of cyanocobalamin was transferred to the portal plasma unchanged, the mitochondrial localization of vitamin B during its absorption is not solely related to the conversion of vitamin B_{12} analogues from one form to another.

2747 A COMPARISON OF ABSORPTION OF FREE FATTY ACID AND α-GLYCERYL ETHER IN THE PRESENCE AND ABSENCE OF A MICELLAR PHASE. (E.) Hoffman, N. E., W. J. Simmonds (U. Western Australia Dept. Physiol., Nedlands) and R. G. H. Morgan. *Biochim. Biophys. Acta* 231(3):487-495, 1971.

Two intraduodenally administered labeled lipids, glyceryl monoether and oleic acid, were absorbed into the lymph at the same relative rate from micellar infusate in unanesthetized bile diverted rats. When no micellar phase was present, the absorption of both glyceryl monoether and oleic acid was decreased, but absorption of the former was depressed much more than in the latter. Slower absorption of both lipids from emulsified infusates into the lymph was associated with accumulation of label in the lumen without accumulation in mucosa; this suggested a rate limiting step in the luminal phase of absorption consistent with the role of micelles in promoting lipid uptake. Differences in absorption of nonmicellar glyceryl monoethers and free fatty acids could not be explained simply in physiocochemical terms.

2748 STUDIES ON THE SPATIAL RELATIONSHIP BETWEEN INTESTINAL DISACCHARIDASES AND THE PHLORIZIN-SENSITIVE TRANSPORT OF GLUCOSE. (E.) Sacktor, B. (Nat. Inst. Child. Health Human Develop., Baltimore, Md.) and N-C. Wu. *Arch. Biochem. Biophys.* 144(1):423-427, 1971.

Maltose, trehalose or sucrose were added to the mucosal or serosal side of intact everted hamster small intestinal sacs in the presence or absence of phlorizin. The distribution of glucose was measured in the serosal and mucosal fluids. Following the addition of disaccharides to the serosal fluid, the concentration of glucose in the serosal medium was manyfold the titer of hexose in the mucosal medium, despite the presence of the transport inhibitor. Disaccharides are apparently not hydrolyzed uniquely on the luminal side of the glucose-transport barrier. Instead, disaccharidase activities are apparently present in a zone of the intestine internal as well as external to a phlorizin-sensitive active transport reaction. Relatively more of the brush border trehalase is internal to the phlorizin-sensitive barrier, compared to other disaccharidases.

2749 FACTORS INFLUENCING THE UPTAKE OF (^{125}I) POLYVINYL PYRROLIDONE BY THE INTESTINE OF THE YOUNG RAT. (E.) Clarke, R. M. (Univ. Physiol. Lab., Cambridge, England) and R. N. Hardy. *J. Physiol. (Lond.)* 212(3):801-817, 1971.

2750 THE NA+ DEPENDENCE OF THIAMINE INTESTINAL TRANSPORT IN VITRO. (E.) Ferrari, G. (U. Pavia Inst. Human Physiol., Italy), U. Ventura and G. Rindi. *Life Sci.* [*I*] 10(2): 67-75, 1971.

2751 METABOLISM OF BUTURIC ACID AND ITS ABSORPTION BY THE CECUM OF THE RAT. (Fr.) Worbe, J. F. (Fac. Sci., Lyon, France) and P. Mottaz. *J. Physiol. (Paris)* 62(Suppl. 3): 465-466, 1970.

See also numbers: 2703, 2744, 2746, 2747, 2754, 2774, 2796, 3547

2752 CONTRADICTIONS OF THE CAUDAL REGION OF THE OESOPHAGUS OF THE CAT. (E.) Titchen, D. A. (U. Melbourne Dept. Vet. Preclin. Sci., Parkville, Australia) and J. S. Wheeler. *J. Physiol. (Lond.)* 215(1):119-137, 1971.

The responses of the most caudal region of the esophagus to stretch, the introduction of acid into its lumen, gastric acid, and stimulation of vagal afferents and efferents were studied in intact, decerebrated or pithed cats. Stretch and HCl in the lumen evoked contractions in the distal 2 cm of the esophagus in all animals studied. While slight gastric distension was stimulatory in evoking esophageal contractions, increased distension caused inhibition. When acid was introduced into the stomachs of decerebrate animals, esophageal contractions occurred; however, this effect was abolished when the vagus nerves were severed. Stimulation of vagal efferents had both excitatory and inhibitory effects on the caudal thoracic region of the esophagus, depending on the frequency of stimulation. Atropine abolished all observed effects on esophageal activity. The observed reactions of the caudal esophagus contribute to its effectiveness as a sphincter.

2753 NECESSITY OF A BOLUS FOR PROPAGATION OF PRIMARY PERISTALSIS IN THE CANINE ESOPHAGUS. (E.) Longhi, E. H. (Va Hosp., Houston, Tex.) and P. H. Jordan, Jr. *Am. J. Physiol.* 220(3):609-612, 1971.

Esophageal motility was measured in dogs prepared with a cervical esophageal cannula or transection of the cervical esophagus with permanent esophagostomy to determine if a primary peristaltic wave in the tubular esophagus is dependent only on the initiation of the act of swallowing or whether the presence of a bolus is required for its generation. In all experimental models studied, the act of swallowing water resulted in contraction of the pharynx and relaxation followed by contraction of the pharyngoesophageal sphincter. When the cannula in the cervical esophagus was closed and the swallowed bolus allowed to pass through the esophagus, 92% of the pharyngeal waves were followed by sequential peristalsis in the lower esophagus. When the bolus was diverted from the esophagus by opening the cannula and occluding the esophagus distally, peristalsis failed to occur in the lower esophagus. When the lumen of the thoracic esophagus was exposed to atmospheric pressure, continuous sequential peristalsis began spontaneously in the lower esophagus along with an increase in base-line pressure. Removal of the influence of atmospheric pressure by occlusion of the tube caused peristalsis to cease and the baseline to return to the resting pressure as soon as the last esophageal wave was over. The act of swallowing appears to be insufficient to initiate primary peristalsis in the tubular esophagus while the intraesophageal bolus is required to produce such activity.

2754 MEMBRANE ACTIVITY IN GUINEA PIG GASTRIC SLING MUSCLE: A NERVE-DEPENDENT PHENOMENON. (E.) Beck, C. S. (Kyushu U. Fac. Dent., Fukuoka, Japan) and T. Osa. *Am. J. Physiol.* 220(5):1397-1403, 1971.

An excitatory junction potential and spike was the response usually evoked following transmural stimulation of guinea pig gastric sling muscle (oblique layer) in normal Krebs solution. When atropine was added to the preparation, a few cells showed no response, but the majority showed an inhibitory junction potential and a loss of contraction and relaxation. Tetrodotoxin (10^{-7} g/ml) blocked all active membrane responses. At maximum stimulus intensity no spike or active slow response could be observed either by sucrose gap or microelectrode recording. Hexamethonium decreased the amplitude of the atropine-induced inhibitory junction potential, indicating a ganglionically mediated inhibition. The sling lacked spontaneous activity unless severely stretched, and propagation of spikes by the smooth muscle membrane (independent of neural function) did not seem to occur. There was a dense nerve fiber network present in the sling bundle of the guinea pig stomach. Apparently, the sling is dependent on neural activity for excitation.

2755 THE INHIBITORY AND EXCITATORY PROPERTIES OF ALPHA ADRENOCEPTORS IN THE RAT STOMACH. (E.) Ogle, C. W. (U. Hong Kong Fac. Med.) and C. Y. Wong. *Life Sci.* 10, Pt. 1(3): 153-159, 1971.

Isolated strips of Wistar rat stomach were suspended in a modified Krebs solution and were exposed for 45 sec to 1 of several drugs (agonists) either alone or 2 min after exposure to the antagonist. The characteristic response to phenylephrine (2 μg) was relaxation of rapid onset; recovery, with overshoot in contraction height, occurred only after washing out the drug. These responses to phenylephrine hydrochloride were always antagonized by phentolamine hydrochloride (10 μg). Isoprenaline (0.05 μg) caused a relaxation of slow onset; on washout, recovery was slow with no overshoot on contraction height. Propranolol (10 μg) abolished the response to isoprenaline. Norepinephrine (0.2 μg) almost always elicited an isoprenaline-like response, while epinephrine (0.05 μg) always elicited a small excitatory response which followed washout. The response to epinephrine and norepinephrine tended to be intermediate between those of phenylephrine and isoprenaline. Only the excitatory responses to 5-hydroxytryptamine (0.005 μg) and to amphetamine (20 μg) were blocked by methysergide (10 µg). Propanolol revealed the phenylephrine-like responses to epinephrine (0.08 µg) and norepinephrine (0.15 µg), while phentolamine (10 µg) revealed the inhibitory isoprenaline-like responses to both epinephrine and norepinephrine. Both antagonists given together completely abolished both types of response to epinephrine and norepinephrine. Phentolamine and methysergide always caused some stimulation when added to the bath.

2756 RESPONSE OF THE ELECTRICAL ACTIVITY, MOTOR ACTIVITY AND ACID SECRETION OF THE HUMAN STOMACH TO PENTAGASTRIN AND HISTAMINE STIMULATION. (E.) Kwong, N. K. (U. Sheffield Dept. Surg., England), B. H. Brown, G. E. Whittaker and H. L. Duthie. *Scand. J. Gastroenterol.* 6(2):145-153, 1971.

The electrical and motor activity and the acid output of the stomach were measured in 21 human subjects using the intragastric method to record the response to pentagastrin and histamine. Pentagastrin administration elicited an increase in electrical and motor activity at 0.6 µg/kg/hr and gastric acid secretion at 0.06 µg/kg/hr. Pentagastrin augmented the observed coupling of the electrical and motor activity reaching a maximum at a dose of 6.0 µg/kg/hr, and caused a 20% mean maximal rise in frequency of the electrical activity. Intravenous histamine (0.04 mg/kg/hr for 75 min) had no effect on either electrical or motor activity, but did elicit an increase in gastric acid output.

2757 PACESETTER POTENTIAL OF THE HUMAN GASTRODUODENAL JUNCTION. (E.) Duthie, H. L. (U. Sheffield Dept. Surg., England), N. K. Kwong, B. H. Brown and G. E. Whittaker. *Gut* 12(4):250-256, 1971.

Electrical activity was measured from stainless steel electrodes implanted under the serosa of the distal 4 cm of the gastric antrum and the proximal 12 cm of the duodenum in 10 subjects undergoing cholecystectomy. The frequency of the pacesetter potential (PP) in both regions showed only slight variation from day to day in all subjects. In the more proximal duodenum, and especially in the most proximal 4 to 5 cm, the predominant pattern showed 3 cycles/min, just as in the antrum. This pattern was occasionally superimposed on the 12 cycle/min PP observed for the duodenum alone. No direct relationship could be established between the frequencies of the gastric (3 cycle/min) and duodenal (12 cycle/min) intrinsic activities. The pattern of the stomach was conducted across the pylorus into the proximal duodenum 4 times as fast as its conduction in the more proximal antrum. Ingestion of water, citrate, or oleate significantly slowed the frequency of the PP in the antrum for 10 min with recovery to resting levels after ingestion in all tests, and a later increase after the latter two meals.

2758 A STUDY IN THE DOG AND CAT OF THE ELECTRICAL ACTIVITY OF THE SMALL INTESTINE SOME MONTHS AFTER TRANSECTION AND TRANSPLANTATION OF THE GUT. (E.) Grivel, M.-L. (Natl. Vet. Sch., Toulouse, France) and Y. Ruckesbusch. *Life Sci.* 10, Pt. 1(5):241-250, 1971.

When the duodenum of both dogs and cats was transected, the frequency of the slow waves distal to the line of section falls precipitously and after 48 hours reaches a low level similar to that of the normal distal ileum. However in both regions of the intestine the slow wave frequency showed a gradual restoration towards pre-operative frequency after 2 months. Reversal of a segment of either duodenum or ileum in the dog or cat resulted in a similar decrease in frequency followed by a similar restoration of basal electrical rhythm. Spike potentials developed in the distal end of the reversed segment and passed to the proximal end before the spikes developed in the posterior duodenum. An ileum transplant and the distal duodenum showed a restoration of frequency rate towards normal with time. In the case of the transplanted ileum the frequency rate exceeded that of the ileum and approached that of the distal duodenum. When the proximal jejunum was transplanted to the ileum, over a period of months it never attained the rhythm of the jejunum but always showed a rhythm greater than that of the ileum. Spike potentials developed on slow waves and were associated with basal electrical rhythm increase whether the gastrointestinal tract was reversed or transplanted. The gastrointestinal tract is apparently controlled by a proximally placed pacemaker.

2759 ADRENAL STEROIDS AND THE ELECTRICAL POTENTIAL OF RAT SMALL INTESTINE IN VIVO. (E.) Noble, H. M. (U. Aston Dept. Biol. Sci., Birmingham, England) and A. J. Matty. *J. Endocrinol.* 49(3):377-386, 1971.

Employing a new technique, the small intestine of the male albino Wistar rat was used for the measurement of the transmucosal electrical potential difference and short-circuit current. A single i.p. injection of 50 µg aldosterone at 24-30 hours before sacrifice had no effect on either of these parameters. With adrenalectomy alone, the short-circuit current was decreased. In previously-adrenalectomized rats, i.p. injection of either 50 µg aldosterone (24-30 hr before sacrifice) or 0.5 mg cortisol (24-30 hours before sacrifice) restored the lowered independent short-circuit current and raised it above control levels and probably also lowered the dependent (hexose) short-circuit current.

2760 STUDIES OF INTESTINAL SLOW WAVE ACTIVITY WITH A DOUBLE SUCROSE GAP APPARATUS. (E.) Mills, R. G. (Monash U. Dept. Physiol., Clayton, Victoria, Australia) and

G. S. Taylor. *Life Sci.* 10, Pt. 1(6):347-353, 1971.

The effect of current pulses on slow wave activity in rabbit ileal segments was studied using a double sucrose gap apparatus. The frequency of the slow waves was 9-13/min at 37° C and the amplitude ranged from 2-11 mV. Action potentials could be initiated by the addition of K^+ (5 mm), atropine (1×10^{-7} - 1×10^{-6} gm/ml) or tetradotoxin (2×10^{-7} g/ml), or electrical stimulation. Increasing the intensity of the stimulus initiated action potentials between slow waves. Stimulation with depolarizing pulses of 500-900 msec duration increased the frequency of slow waves. Atropine and tetrodotoxin at the concentrations mentioned above also made possible the triggering of slow wave activity. Application of hyperpolarizing pulses during slow wave activity elicited changes in membrane resistance. The increase in excitability during slow wave activity suggests that the simultaneous occurrence of slow waves in many cells could lead to the synchronization of action potential discharge and hence contractions in a segment of intestine.

2761 EFFECT OF METOCLOPRAMIDE ON GASTROINTESTINAL MOTILITY IN MAN. A MANOMETRIC STUDY. (E.) Eisner, M. (Univ. Med. Clin., Basel, Switzerland). *Am. J. Dig. Dis.* 16(5): 409-419, 1971.

Metoclopramide (20 mg, i.v.) increased the intraluminal pressure in the gastric antrum, duodenum, small intestine and colon, but not in the sigmoid colon or rectum. The stimulatory effect of metoclopramide was seen in the duodenum and small intestine, whether the resting pressure was high or low. Simultaneous antral and duodenal pressure recordings showed than an antral contraction was usually followed by duodenal pressure waves which exhibited a particular phasic activity. A reciprocal correlation was found between pressure and movement of the Radiopill in the small intestine but not in the large intestine. Symptoms induced by metoclopramide were minimal and included increased bowel activity and abdominal discomfort. Motility of an intestinal segment cannot be understood from pressure measurements in this segment alone. The pressure in the adjacent proximal and distal segments of the intestine is of equal importance.

2762 A NEW METHOD FOR LONG-TERM MEASUREMENT OF GALLBLADDER CONTRACTION IN THE CONSCIOUS DOG. (E.) Jones, D. T. (U. Florida Coll. Med., Gainesville), J. Isaza and E. R. Woodward. *J. Surg. Res.* 11(4):187-190, 1971.

Mongrel dogs were prepared with a Thomas cannula in the stomach, a Gregory cannula in the duodenum (about 10 cm distal to the pylorus) and a cannula inserted into the fundus of the gallbladder through a cholecystostomy. The gallbladder cannula consisted of a 25 ml condom balloon attached securely to a 2 inch long polyethylene catheter (2.5 mm internal diameter) which was impacted into the cylinder of a stainless steel cannula 3 inches long with a 5/8 inch flat flange on the internal end. Dogs were permitted to recuperate for 3 weeks and were fasted for 18 hrs before experimental measurement of gallbladder contractions in response to cholecystokinin (1 Ivy U/kg i.v. over 30 min) and, after return of gallbladder motility to basal levels, intraduodenal instillation of 1 ml/kg of a 50% olive oil emulsion over a 30-min period. Resting gallbladder pressures ranged from 10-20 cm H_2O. The dose of cholecystokinin was that which gave a 50% maximal response and increased the gallbladder pressure to 157 ± 21.5% above basal levels. The increase with olive oil was 140 ± 25%, and this did not differ significantly from the cholecystokinin-induced response.

2763 A CROSS-OVER COMPARISON OF THE EFFECT OF MORPHINE, PETHIDINE, PENTAZOCINE, AND PHENAZOCINE ON BILIARY PRESSURE. (E.) Economou, G. (Mansfield Group Hosps., England) and J. N. Ward-McQuaid. *Gut* 12(3):218-221, 1971.

The effects of pentazocine, morphine, meperidine hydrochloride (pethidine) and phenazocine on biliary pressure were studied in 31 patients by direct measurement after operation, through T-tube draining the common bile duct after cholecystectomy and choledochotomy. Following pentazocine administration (31.4 mg mean dose) 3 days after surgery, biliary pressure was significantly lower than after morphine administration (10.5 mg mean dose). Nine days after surgery, biliary pressure was also significantly lower after pentazocine injection (35.4 mg) than after morphine (12.3 mg). No significant differences were observed between the effects of pentazocine and meperidine, or between those of pentazocine and phenazocine on biliary pressure. Pentazocine seems to be the most appropriate analgesic in pain from biliary and pancreatic disease or in operations for its relief.

2764 STUDIES ON DRUGS AFFECTING THE CHOLEDOCHODUODENAL JUNCTION IN RABBITS WITH SPECIAL REFERENCE TO THE ACTION OF SPASMOLYTIC AND ANALGESIC DRUGS. (E.) Luoma, P. (U. Oulu Dept. Pharmacol., Finland). *Acta Pharmacol. Toxicol.* [*Suppl.*] *(Kbh.)* 29(1):1-55, 1971.

Of 3 catecholamines (noradrenalin, adrenalin, and isoprenaline) only isoprenaline caused relaxation in the rabbit choledochoduodenal junction. Phentolamine (alpha adrenergic blocker) did not affect the choledochoduodenal junction, while propranolol (beta adrenergic blocker) produced in it a slight, brief contraction. Propranolol at 0.25 mg/kg raised the blood pressure transiently while 1.0 mg/kg produced a prolonged decrease of blood pressure. Spasmolytic drugs such as atropine, N-butyl hyoscine bromide, tiemonium iodide, oxyphencyclimine, trophenziline bromide and papaverine were able to elicit relaxation of both neostigmine-induced neurogenic spasms and $BaCl_2$-induced myogenic spasms in the choledochoduodenal junction. The order of efficacy of the above 6 drugs with regard to their effect on choledochoduodenal flow following inhibition by neostigmine was given as was the resulting order following $BaCl_2$ inhibition. Tropenziline bromide, N-butyl hyoscine bromide and tiemonium iodide following neostigmine administration, reduced the blood pressure most while after $BaCl_2$ administration the highest fall in blood pressure was produced by tropenziline bromide. Meperidine hydrochloride (pethidine), pentazocine, phenazocine and dextropropoxyphene as well as the antitussive dextromethorphan contracted the choledochoduodenal junction. The largest average elevations in common bile duct pressure were produced by pentazocine, meperidine hydrochloride and phenazocine.

2765 ADRENERGIC INNERVATION AND RECEPTORS IN THE SPHINCTER OF ODDI. (E.) Mori, J. (Kyoto U. Fac. Med., Japan), H. Azuma and M. Fujiwara. *Eur. J. Pharmacol.* 14(4):365-373, 1971.

The adrenergic innervation to the biliary tract was studied in guinea pigs and rabbits using fluorohistochemical techniques, and a pharmacological analysis of the response of the sphincter of Oddi to sympathomimetic amines was conducted in rabbits. Greenish fluorescent adrenergic nerve fibers with specific varicose structures were seen in the muscle layer of the guinea pig gallbladder, and in the muscle layer close to the choledochoduodenal junction in both guinea pigs and rabbits. Arterial injection of isoproterenol (10 µg/kg) or epinephrine (10 µg/kg) close to the choledochoduodenal region decreased perfusion pressure through the sphincter of Oddi. This effect was prevented by propranolol (2 µg/kg i.v.) but not by phenoxybenzamine (2 µg/kg i.v.), and prolonged by pyragallol (10 µg/kg i.v.). Phenylephrine (20 µg/kg i.a.) increased perfusion pressure in 4 of 5 cases, and this effect was prevented by phenoxybenzamine (2 µg/kg i.v.) but not by propranolol (2 µg/kg i.v.). Results with epinephrine and norepinephrine were inconsistent. Arterial injection of isoproterenol, epinephrine, norepinephrine, or phenylephrine decreased the perfusion pressure through the duodenal lumen; however, this response was unaffected by phenoxybenzamine or propranolol. Alpha- and beta- adrenergic receptors seemingly mediate contraction and relaxation, resp., of the sphincter of Oddi in rabbits.

2766 INTRALUMINAL PRESSURE CHANGES OF THE HUMAN ESOPHAGUS. (E.) Masaki, S. (Shinshu U., Matsumoto, Japan) and S. Kiuchi. *Ann. Otol. Rhinol. Laryngol.* 80(1):83-91, 1971.

2767 CORTICAL CONTROL OF THE BULBAR SWALLOWING CENTER. (Fr.) Car, A. (CNRS Fac. Sci., Marseille, France). *J. Physiol. (Paris)* 62(4):361-386, 1970.

2768 UPPER ESOPHAGEAL SPHINCTER IN HEALTH AND DISEASE. (E.) Ellis, F. H., Jr. *Surg. Clin. North Am.* 51(3):553-565, 1971.

2769 CONSIDERATIONS ON THE NORMAL RADIOLOGIC ASPECT OF THE ESOPHAGOGASTRIC REGION. (Rum.) Niculescu, T. (Carol Davilla Hosp., Bucharest, Rumania), E. Popescu and P. Gradinaru. *Oncol. Radiol. (Bucur.)* 9(6):481-494, 1970.

2770 STIMULATION TIME INTENSITY CURVES OF MECHANICAL AND ELECTRICAL STIMULATION OF THE SPHINCTER OF THE FROG STOMACH. (Ger.) Rossberg, F. (Karl Marx U. Physiol. Inst., Leipzig, Germany) and A. Kiessling. *Ergeb. Exp. Med.* 3:103-107, 1970.

2771 SERIAL ROENTGENOGRAPHIC OBSERVATIONS ON THE PASSAGE OF FOODS THROUGH THE HUMAN STOMACH. (E.) Toyama, T. (U. Chiba Dept. Radiol. Japan) and J. R. Blickman. *Radiol. Clin. Biol.* 40(1):29-38, 1971.

2772 IN VITRO PHARMACOLOGIC AND HISTOPATHOLOGIC STUDIES ON THE HUMAN CARDIAC SPHINCTERIC MUSCLE FROM ACHALASIC AND CONTROL PATIENTS. (E.) Waller, S. L. (Cent. Middlesex Hosp., London), J. J. Misiewicz, P. P. Anthony and J. W. P. Gummer. *Am. J. Dig. Dis.* 16(6):566-568, 1971.

2773 ELECTRICAL ACTIVITY OF THE SMOOTH MUSCLES OF THE STOMACH AND THE SMALL INTESTINE. (Rus.) Bogach, P. G. (Kiev State U. Inst. Physiol., USSR), N. A. Kaplunenko, G. M. Chaichenko and K. T. Milenov. *Fiziol. Zh. SSSR* 57(2):276-283, 1971.

2774 ELECTROMOTOR REACTIONS OF THE SMALL INTESTINE DURING GLUCOSE ABSORPTION. (Rus.) Lutatski, R. A. (Krupskaia Inst. Educ., Kherson, USSR), A. I. Novosirlova and N. D. Beresovskaia. *Fiziol. Zh. SSSR* 57(2):292-296, 1971.

2775 EFFECT OF METOCLOPRAMIDE AND OF SULPIRIDE ON THE ILEAL PERISTALTIC REFLEX IN THE GUINEA PIG. (Fr.) Fontaine, J. (Free U. Brussels Sch. Med. Pharm., Belgium) and J. J. Reuse. *C. R. Soc. Biol. (Paris)* 164(8-9):1873-1875, 1970.

2776 MODIFICATION OF THE TECHNIC OF INCREASING THE RATE OF TRANSIT THROUGH THE SMALL INTESTINE WITH CHOLECYSTOKININ. (Fr.) Monod, M. E. (Avignon, France). *Arch. Fr. Mal. App. Dig.* 60(3):141-142, 1970.

2777 TRANSMISSION AT THE NEURO-EFFECTOR JUNCTION OF THE ISOLATED MYENTERIC PLEXUS-LONGITUDINAL MUSCLE PREPARATION OF THE GUINEA PIG ILEUM. (E.) Cowie, A. L., H. W. Kosterlitz (U. Aberdeen Dept. Pharmacol., Scotland), R. J. Lydon and A. A. Waterfield. *Am. J. Dig. Dis.* 16(6):548-549, 1971.

2778 INTERRELATION OF BIOELECTRIC AND MOTOR ACTIVITY OF THE STOMACH, DUODENUM, AND GALLBLADDER. (Rus.) Ustinov, V. N. (Pavlov Inst. Physiol., Leningrad, USSR) and V. I. Kotelnikova. *Fiziol. Zh. SSSR* 57(2):284-291, 1971.

2779 A POSSIBLE ROLE FOR PROSTAGLANDINS IN GASTROINTESTINAL MOTILITY. (E.) Bennett, A. (King's Coll. Hosp. Med. Sch., London), K. G. Eley and G. B. Scholes. *Am. J. Dig. Dis.* 16(6):552, 1971.

2780 A THEORY OF INTEGRATED GASTROINTESTINAL MOTOR ACTIVITY BASED ON THE CHAIN OSCILLATOR MODEL. (E.) Nelsen, T. S. (Stanford U. Med. Ctr., Palo Alto, Calif.). *Am. J. Dig. Dis.* 16(6):543-547, 1971.

See also numbers: 2797, 2992, 3000

SECRETION AND METABOLISM

2781 LOCALIZATION AND ONSET OF AMYLASE ACTIVITY IN MOUSE SALIVARY GLANDS DETERMINED BY A SUBSTRATE FILM METHOD. (E.) Smith, R. J. (Tufts U. Sch. Med., Boston, Mass.), J. Frommer and R. Schiff. *J. Histochem. Cytochem.* 19(5):310-319, 1971.

The age of onset and localization of the amylase activity in the salivary glands of immature mice was determined using a modification of the substrate film technique for amylase localization. The parotid glands of both males and females showed their first activity at 8 days of age, rapidly increasing so that by 16 days the entire gland was involved. The very gradual differentiation of the parotid gland did not allow for observation of any apparent histologic changes associated with the onset of amylase activity within the gland. The submandibular gland of males and females gave positive results at 24 days and 36 days, resp., with the activity being limited to the convoluted tubules. The sublingual gland was amylase-negative at all ages.

2782 THE EFFECTS OF INTERACTIONS BETWEEN GUSTATORY STIMULI ON THE REFLEX FLOW-RATE OF HUMAN PAROTID SALIVA. (E.) Speirs, R. L. (London Hosp. Med. Coll.). *Arch. Oral Biol.* 16(4):351-365, 1971.

Masking of a primary taste sensation (sweet, salt, sour) by another generally initiated a greater flow of saliva than would be predicted on the basis of the intensity of the taste of the mixed solution. The suppressed component contributed to the salivary response. A mutual masking of saltiness and sweetness in mixtures of these 2 solutes (sucrose and sodium chloride) was observed. The salivary response to the gustatory stimuli in an sugar-acid (ascorbic) mixture was usually much less than the calculated theoretical sum of the 2 responses when tested separately. However, with mutual masking of saltiness and sweetness, the salivary response flow rate was generally just less then the summated responses of the 2 individual components. A particular gustatory neural pattern may be interpreted differently by the taste perception areas in the thalamus and cortex and the salivary nuclei in the medulla.

2783 THE ISOLATION AND BIOLOGIC ACTIVITIES OF PURIFIED SECRETORY IGA AND IGG ANTI Salmonella typhimurium 'O' ANTIBODIES FROM RABBIT INTESTINAL FLUID AND COLOSTRUM. (E.) Eddie, D. S. (Univ. Hosp., Leeds, England), M. L. Schulkind and J. B. Robbins. *J. Immunol.* 106(1): 181-190, 1971.

2784 FUNCTION OF THE MAIN DIGESTIVE GLANDS IN RHEUMATOID ARTHRITIS. (Rus.) Gubergrits, A. I. and E. A. Miroshnik. *Vopr. Reumatol.* (3):31-37, 1970.

See also number: 2796

STOMACH

2785 EFFECTS OF CORTISONE ON ACID, PEPSIN, SULFATED POLYSACCHARIDES AND GLYCOPROTEIN SECRETION BY THE MUCOSA OF DENERVATED FUNDIC POUCHES OF DOGS. (E.) Bremen, J. (Free U. Brussels Dept. Surg., Belgium), R. Ley, M. C. Woussen-Colle, S. Verbeustel and J. de Graef. *Digestion* 4(2):81-91, 1971.

A single dose of hydrocortisone caused a slight decrease of acid and pepsin output, but no change in chondroitin sulfate or mucus secretion. The progressive fading of acid, pepsin and chondroitin sulfate outputs during a 4 hr stimulation remained unchanged. Six of 7 dogs showed an increase in acid, pepsin and chondroitin sulfate outputs following chronic cortisone administration (50 mg/day). There was, however, a latent time interval of at least 3 days before the effect became manifest. Output of both total and acidic glycoproteins from the visible mucus were increased during chronic treatment in all dogs, but not after acute corticosteroid treatment. A dose of 300 mg/day of cortisone acetate caused effects similar to those found following the lower dose. In the fundus of dogs, the synthesis and secretion of glycoproteins was not decreased during steroid treatment. It remains possible that local changes take place, inducing local ulcerations or qualitative changes during the treatment, which lead to decreased mucosal resistance.

2786 COMPARATIVE STUDY OF ANTRAL GASTRIN ACTIVITY IN SOME MAMMALS. (E.) Amure, B. O. (U. Ibadan Dept. Physiol., Nigeria) and

A. Omole. *Br. J. Pharmacol.* 41(4):629-639, 1971.

Gastrin activities of extracts from antral mucosa of several mammalian species was determined. Herbivores (goats and rabbits) gave rise to a larger yield of onide gastrin powder and greater gastrin activity per g wet weight of antral mucosa than nonherbivores (cats, dogs, man and pigs). Potencies of gastrin from the various species was similar. During prolonged freezing of animal antra and consequent thawing before extraction, significant losses in gastrin activity occurred in the dog. A higher concentration of gastrin in the antra of the herbivorous species would necessarily imply either a higher count of gastrin-containing cells per unit area of antral mucosa in these species compared to the others or a greater storage per gastrin-containing cell.

2787 EFFECT OF CHOLECYSTOKININ AND CAERULEIN ON GASTRIC SECRETION IN CATS. (E.)

Way, L. W. (U. California Dept. Surg., San Francisco). *Gastroenterology* 60(4):560-565, 1971.

The effects of cholecystokinin (CCK; 8-32 U/kg/hr), caerulein (0.15-1.2 µg/kg/hr), and gastrin (0.5-2.0 µg/kg/hr) on gastric acid and pepsin secretion were studied in cats by making measurements of acid and pepsin via gastric fistulae. Gastrin and CCK produced parallel increases in acid secretion, and further purification of CCK did not alter its properties as an acid secretagogue. Natural and desulfated caerulein also exhibited parallel dose-response curves, with natural caerulein being about 7 times as potent for acid secretion. A low dose of caerulein administered with a low dose of gastrin evoked an acid output greater than with either alone. Similar results were obtained when high doses of gastrin and CCK were given simultaneously. CCK was a weaker pepsin stimulant than gastrin, and pepsin secretion was less with the administration of natural caerulein than desulfated caerulein. A low dose of gastrin in combination with a low dose of natural caerulein evoked rates of pepsin secretion higher than when they were given alone.

2788 FATIGUE OF THE ANTRAL GASTRIN MECHANISM FOLLOWING ELECTRICAL VAGAL STIMULATION.

(E.) Molina, J. E. (U. Minnesota Med. Ctr., Minneapolis), W. P. Ritchie, Jr., R. F. Edlich, Y. Tomiyama and O. H. Wangensteen. *Surgery* 69(5):680-685, 1971.

In mongrel dogs, both vagus nerves were transected at the level of the pulmonary hilus and recording and stimulating electrodes were attached to the vagus nerve proximal to the point of transection. The stomach was later cannulated in a retrograde fashion through the pylorus. Stimulation of the vagus nerve in the chest (pulses usually less than 20 mV applied for 0.08 to 0.10 msec at a frequency of 1/second for 15 min) caused gastric acid production lasting for 3-4 hr. Application of a second stimulus at the end of the secretory period failed to elicit further acid production. Gastric acid production during the single 15-min period of stimulation was augmented by previous s.c. administration of 0.4 mg/kg of histamine acid phosphate. Exogenous i.v. administration of lyophilized gastrin (at 82-90 µg/kg/15 min) after the electrically-induced phase of secretion maintained the gastric acid production for as long as the infusion continued. No gastric acid production was induced when the period of electrical vagal stimulation was followed by perfusion of innervated antral pouches with a 0.5% acetylcholine solution.

2789 ANALYSIS OF INHIBITION OF GASTRIC SECRETION BY ACID IN THE DUODENUM. (E.)

Harrison, L. (U. Oklahoma Sch. Med., Oklahoma City) and L. R. Johnson. *Am. J. Physiol.* 220(3): 679-682, 1971.

The effects of introducing varying concentrations of HCl into the duodenum on pentagastrin-stimulate gastric secretion was studied in 3 dogs with Heidenhain pouches, duodenal fistulas, and open gastric fistulas. Infusion of 4.0 µg/kg/hr pentagastrin produced the maximal secretory response. Introduction of 160 mEq/l HCl into the duodenum inhibited this response by about 60%. Decreasing concentrations of HCl resulted in corresponding decreases in the inhibition of gastric secretion with little or no inhibition with 40 mEq/l. A straight line relationship existed between dose of acid administered intraduodenally and the percent secretory response remaining. Doubling the dose of pentagastrin from 1.0 to 2.0 and from 2.0 to 4.0 µg/kg/hr had little effect on the absolute level of secretion remaining during inhibition. For pentagastrin alone, the calculated maximal response (CMR) was 0.850±0.037 mEq H^+/15 min, and for pentagastrin plus 160 mEq/l HCl the CMR was 0.343±0.090 mEq H^+/15 min. Acid in the duodenum seemingly inhibits gastric secretion through a noncompetiti mechanism.

2790 FAILURE OF HIGH P_{CO_2} IN THE DUODENAL BULB TO INHIBIT GASTRIC ACID SECRETION.

(E.) Nilsson, G. (Karolinska Inst., Stockholm, Sweden) and S. J. Rune. *Acta Physiol. Scand.* 81(3):349-354, 1971.

Gastric acid secretion was stimulated by i.v. pentagastrin administration in 3 dogs with Pavlov pouches and isolated pouches of the duodenal bulb. No change in the gastric acid secretion was observed when the PCO_2 of the buffer solution perfusing the duodenal bulb was increased from 0 to 150 mm Hg. Perfusion with pure CO_2 (700 mm Hg) did not reduce the acid output when compared to the gastric acid responses during the preceding control hr. High P_{CO_2} in the duodenum is apparently not involved in the activation of the bulbar mechanism inhibiting gastric acid secretion.

2791 LOCALIZATION OF INTRINSIC FACTOR AND COMPLEMENT FIXING INTRINSIC FACTOR-INTRINSIC FACTOR ANTIBODY COMPLEX IN PARIETAL CELL OF MAN. (E.) Jacob, E. and G. B. J. Glass (New York Med. Coll., N. Y.). *Clin. Exp. Immunol.* 8(4):517-527, 1971.

The intrinsic factor antibodies from pernicious anemia serum, after removal of parietal cell antibody, and intrinsic factor antibodies produced in rabbits immunized with human semipurified intrinsic factor were used to trace the intrinsic factor in parietal cells by the indirect immunofluorescence test. Intrinsic factor antibody from both sources produced a practically identical pattern of fluorescence in human parietal cells. This fluorescence was generally located peripherally at the cell membrane; the localization differs from that seen (parietal cell cytoplasm) when a fluoresceinated anti-hyman complement serum was used. Hence an antigen-antibody complex, demonstrated with the human parietal cell cytoplasm, may fix complement. Apparently intrinsic factor is localized at highest concentration at the membrane of the parietal cell in man. The intrinsic factor-intrinsic factor antibody-complement complex may play an important role in the development of gastric atrophy in pernicious anemia.

2792 SOME EFFECTS OF NICOTINE ON GASTRIC SECRETION IN RATS. (E.) Thompson, J. H. (U. California Sch. Med., Los Angeles), R. George and M. Angulo. *Proc. West. Pharmacol. Soc.* 14:173-177, 1971.

In sham-operated rats, chronic nicotine injections (equivalent to 15-20 cigarettes/day) significantly increased basal gastric juice volume, acid output and pepsin output. Following vagotomy there was no difference for any parameter between chronic nicotine-, or chronic nicotine control-injected rats. Chronic nicotine continued to stimulate gastric juice volume and acid and pepsin output after caudal hypothalamic lesions, a response that was blocked by vagotomy. Lesions in the anterior hypothalamus blocked the nicotine-induced gastric secretory stimulation. No differences were seen between lesioned rats with or without vagotomy. It is suggested that chronic nicotine-induced gastric secretory stimulation is mediated via anterior hypothalamic activation and intact vagus nerves. Results presented are of potential clinical interest with respect to the previously documented deleterious effects of tobacco smoking on peptic ulcer disease in man.

2793 THE SEPARATION AND PREPARATION OF HUMAN PEPSINS 3 AND 5 FROM THE GASTRIC JUICE OF SINGLE INDIVIDUALS, AND THE MODE OF ACTION OF HUMAN AND SWINE PEPSINS ON THE β-CHAIN OF OXIDIZED INSULIN. (E.) Etherington, D. J. (ARC Meat Res. Inst., Langford, Bristol, England) and W. H. Taylor. *Biochim. Biophys. Acta* 236(1): 92-98, 1971.

The sites of action of human pepsins 3 and 5, swine pepsin A and swine pyloric pepsin upon the β-chain of oxidized insulin have been determined at both pH 1.7 and 3.4. The specificity of swine pyloric pepsin differs from that of swine pepsin C, in that the former enzyme can split the bond Phe-Val, this distinction supporting the possibility that swine pepsin C and swine pyloric pepsin are different enzymes. There seemed to be no consistent species differences between the human and swine enzymes, 5 bonds in the middle of the β-chain being unequivocally hydrolysed by each near pH 2. Hence, it seems that these pepsins may be derived from a common evolutionary precursor enzyme. The pepsins seemingly do not have 2 active sites with different substrate specificities but have 2 active sites, each with nearly identical activity, 1 operating maximally at pH 2 and the other at pH 3.5. Or these enzymes may have a single active site at which substrate binding is greatly affected by pH.

2794 PEPSIN OUTPUT FROM THE DAMAGED CANINE HEIDENHAIN POUCH. (E.) Johnson, L. R. (U. Oklahoma Dept. Physiol. Biophys., Oklahoma City.). *Am. J. Dig. Dis.* 16(5):403-407, 1971.

In dogs with Heidenhain pouches and gastric fistulas, irrigation of the pouches with 200 mM HCl more than doubled pepsin output in comparison to irrigation with 100 mN each of HCl and NaCl. There was no bleeding from the pouches, and the dogs showed no signs of restlessness or discomfort. However, at 300 mM HCl, the pouches were damaged and pepsin output reached levels considerably higher than seen with 200 mM HCl. After 2 periods with 300 mM HCl, the pouches began to bleed. Calculation of the loss of H^+ across the pouch mucosa indicated that the amount of pepsin appearing in the pouch corresponded with the amount of acid lost through the stomach wall. Pepsin output as related to the back diffusion of hydrogen may be of etiologic importance in ulcer disease.

2795 H^+ SECRETION AND TISSUE Cl^- CONTENT OF FROG GASTRIC MUCOSA BATHED IN Cl^--FREE MEDIA. (E.) Shanbour, L. L. (U. Alabama Dept. Physiol. Biophys., Birmingham) and W. S. Rehm. *Proc. Soc. Exp. Biol. Med.* 136(4):1236-1239, 1971.

The gastric mucosa of Rana pipiens was dissected (with removal of external muscle layers) and was bathed in a Cl^--free nutrient medium gassed with 95% O_2-5% CO_2. In this situation, sulfate was substituted for Cl^- and sucrose was used to compensate for the resultant osmotic deficit. Under these conditions there was found to be secretion of H^+ from the gastric mucosa *in vitro*. The amount of H^+ secreted was significantly greater than the residual Cl^- within the gastric mucosa. It was concluded that secretion of H^+ can occur without the concomitant secretion of Cl^-.

2796 DIFFERENTIAL EFFECTS OF -SH REAGENTS ON TRANSPORT AND ELECTRICAL PROPERTIES OF GASTRIC MUCOSA. (E.) Solberg, L. A., Jr. (U. California Dept. Physiol. Anat., Berkeley) and J. G. Forte. *Am. J. Physiol.* 220(5):1404-1412, 1971.

Sulfhydryl reagents were added to either the nutrient or secretory solution of isolated bullfrog gastric mucosa. When added to the secretory solution, HgCl, and N-ethylmaleimide decreased H^+ secretion, transmucosal potential difference, resistance and short-circuit current. In contrast to the above compounds, p-(chloromercuri)benzene sulfonate (pCMBS) only partially inhibited H^+ transport and increased potential difference and short-circuit current. The change in current was a mirror image in time to the change in H^+ secretion in most cases. However, in cases where the observed increase in short-circuit current exceeded the fall in H^+ current, increased Cl^- transport accounted for the additional short circuit current. When thiocyanate (acid secretion inhibitor) was applied to the mucosa after pretreatment with pCMBS, the residual H^+ secretion, which remained after pCMBS treatment, was inhibited but no change in short-circuit current occurred. Thus the effect of SCN^- after pCMBS treatment appears to be the inhibition of an electrically neutral component of HCl secretion. No -SH reagent produced its characteristic response from the nutrient side. Responses probably arose from a modification of sulfhydryl groups within the secretory membrane.

2797 SELECTIVE AND TOTAL VAGOTOMY WITH SUPRAPYLORIC ANTRECTOMY: A COMPARATIVE STUDY OF GASTRIC SECRETION AND EMPTYING IN DOGS. (E.) Kilby, J. O. and C. A. Griffith (1041-116th N.E., Bellevue, Wash.). *Surgery* 69(5):702-707, 1971.

In 5 adult mongrel dogs 3 procedures were performed at 3 different stages: Heidenhain pouch, selective vagotomy and suprapyloric antral resection, and total vagotomy. Gastric emptying with minimal stasis was satisfactory in 4 dogs in the second stage after selective vagotomy plus suprapyloric antrectomy. After hepatic and celiac vagotomy only 1 dog showed satisfactory emptying, the other 4 demonstrating gross stasis. There was a significantly higher Heidenhain pouch secretion after total than after selective vagotomy. Results suggest that clinical application of suprapyloric antrectomy with total (as opposed to selective) vagotomy is not justified. The loss of gastric acid inhibition may prove to be a causative factor for a lesser rate of recurrent ulcer after selective than after total vagotomy. In attempting to control the diathesis of duodenal ulcer without producing the dumping syndrome, continued clinical evaluation of pylorus preserving procedures in combination with selective vagotomy seems justified.

2798 EFFECT OF INSULIN ON ACID AND PEPSIN SECRETION IN VAGOTOMIZED AND NON-VAGOTOMIZED PATIENTS ALREADY STIMULATED BY PENTAGASTRIN. (E.) Limbosch, J. M. (Free U. Brussels, Belgium), J. De Graef and A. Gerard. *Scand. J. Gastroenterol.* 6(2):183-188, 1971.

The effects of insulin on the acid and pepsin response to constant stimulation by pentagastrin was studied in 14 vagotomized and 16 nonvagotomized patients before and after surgery. When insulin was injected 75 min after the start of pentagastrin stimulation, there was no significant change in the acid secretion pattern of nonvagotomized patients. In vagotomized patients, insulin significantly decreased the acid output by 31%. The administration of insulin after pentagastrin stimulation caused a sharp increase in pepsin output (88%) in nonvagotomized patients, and a decrease (32%) in vagotomized patients. The inhibitory effect of insulin on acid secretion observed after vagotomy may be a factor in the determination of the pattern of acid response during an insulin test.

2799 EXPERIMENTAL STIMULATION OF GASTRIC SECRETION WITH AMINO ACIDS. (Ger.) Melzer, H. (Schwabing Hosp., Munich, Germany), D. Weber and R. Wotzka. *Arzneim. Forsch.* 21(1): 107-110, 1971.

Changes in gastric secretion produced by p.o. administration of 400 mg of various amino acids through a stomach tube were compared with changes produced by betazole (50 mg s.c.), caffeine (200 mg p.o.), and a lactose placebo (400 mg p.o.). About half of the 142 subjects examined were patients with gastric disorders. The placebo produced only 55.3% and caffeine, 72.4% of the volume of gastric juice produced after administration of betazole. Lysine and β-alanine were only slightly less effective than caffeine. The effect of glutamic acid was about the same as that of the placebo while gelatine hydrolyzate had less effect. The amino acids used in this study produced only 16-28% of the total gastric acid secretion produced by betazole and 28-42% of the total enzyme secretion. Both lysine and β-alanine caused a highly significant increase in enzyme secretion, but basic and acid salts of glutamic acid and the amino acids (glycine, proline, and hydroxyproline) present in high concentrations in gelatine hydrolyzate did not stimulate gastric enzyme secretion. Increases in total gastric acid, pepsin, and gastricsin secretion after administration of lysine were not strictly dose-dependent.

2800 PROTEIN-LOSING GASTROPATHY PRODUCED BY SULFHYDRYL REAGENTS. (E.) Davenport, H. W. (U. Michigan Dept. Physiol., Ann Arbor). *Gastroenterology* 60(5):870-879, 1971.

Sulfhydryl reagents in neutral or acid solution were added to canine Heidenhain pouches of the oxyntic glandular area, following and preceding irrigation of these pouches with an acid test solution. In neutral or acid solution, dithiothreitol (4 mM) increased Na$^+$, fluid, plasma protein and histamine outputs from the gastric mucosa. There was no difference in disappearance of H$^+$ when the pouches were irrigated with 100 mN HCl following dithiothreitol treatment because stimulated acid secretion replaced acid disappearing into the mucosa. After a 10-20 min latent period, the effect of dithiothreitol lasted as long as the reagent was in contact with the mucosa; mucosal blood flow increased in proportion to volume output from the mucosa. Another agent, 2,3-dimercaptopropranol had a qualitatively similar effect. N-acetylcysteine, a mucolytic agent, had no effect upon Na$^+$ and H$^+$ fluxes or upon volume or plasma outputs. Administration of p-chloromercuribenzoate resulted in breaks in the mucosal barrier but did not effect changes in volume or plasma outputs.

2801 EFFECT OF CORTICOSTEROIDS ON GASTRIC ACID SECRETION IN THE RAT. (Ger.) Halter, F. (Univ. Med. Clin., Bern, Switzerland), C. Müllener, B. Kohler, U. Saner and G. M. Smith. *Schweiz. Med. Wochenschr.* 101(20):755-756, 1971.

2802 STUDIES ON MAXIMAL GASTRIC ACID SECRETION IN THE RAT. (Ger.) Schmidt, H. A. (Univ. Med. Klin., Marburg, Germany), H. Bock and E. O. Riecken. *Arzneim. Forsch.* 20(10): 1510-1513, 1970.

2803 INFLUENCE OF CALCIUM ON GASTRIC SECRETION. (Cz.) Kocian, J. (Res. Inst. Human Nutr., Prague) and D. Kolarova. *Cesk. Gastroenterol. Vyz.* 24(6):244-251, 1970.

2804 COMPARATIVE MEASUREMENTS OF GASTRIC SECRETION. STUDY OF 1248 CASES. (Sp.) Ortega Borjas, J. A. (Gen. Hosp., Caracas, Venezuela), E. Quiroz and S. Felce. *G.E.N. (Caracas)* 25(1):15-31, 1970.

2805 STUDY ON K^{25} (PEPTIC OUTPUT) UNDER BASAL CONDITIONS AND AFTER INSULIN ADMINISTRATION. (Fr.) Balmes, J. L., X. Baillat and J. Romanet. *Montpellier Chir.* 16(5):465-468, 1970.

2806 DETERMINATION OF THE PROTEINS IN GASTRIC JUICE BY ELECTROPHORESIS. (Sp.) Oporto Ruiz, T. (Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(6):729-732, 1971.

2807 GASTRIC ACID SECRETION AND CORTICOSTEROIDS. (Sp.) Freytes, M. A. (San Roque Hosp., Cordoba, Spain), A. C. Vivanco, A. Butti and J. Carri. *Rev. Esp. Enferm. Apar. Dig.* 34(2):183-188, 1971.

2808 THE SECRETORY ACTIVITY OF THE GLANDS IN THE CARDIAC ZONE OF THE PIG STOMACH. II. THE INFLUENCE OF THE INFUSION OF VARIOUS LIQUIDS ON THE SPONTANEOUS SECRETION OF THE ISOLATED CARDIAC MUCOSA. (Ger.) Holler, H. (Vet. Sch., Hannover, Germany). *Zentralbl. Veterinarmed.* [*A*] 17(10):857-873, 1970.

2809 INHIBITION OF ACETYLCHOLINE-STIMULATED GASTRIN RELEASE BY THE TOPICAL ANESTHETIC, OXETHAZAINE. (E.) Posey, E. L., Jr. (U. Mississippi Sch. Med., Jackson), K. Boler and L. Posey. *Am. J. Gastroenterol.* 55(1):54-57, 1971.

2810 THE MECHANISM OF REGULATION OF THE GASTRIC SECRETION BY THE SMALL INTESTINE. (Rus.) Fisher, A. A. and R. I. Poliak. *Klin. Med. (Mosk.)* 49(1):19-25, 1971.

2811 STUDIES ON STIMULANTS FOR THE GASTRIC JUICE TEST. I. COMPARISON OF TETRAGASTRIN WITH CAFFEINE AND HISTALOG. (Jap.) Ito, Y. (2nd Nat. Hosp., Tokyo), H. Shibata and H. Kashima. *Iryo* 25(2):111-116, 1971.

2812 CLINICAL INTERPRETATION OF THE BIOCHEMICAL STUDY OF GASTRIC SECRETION. (Sp.) Meeroff, M. and J. C. Meeroff. *Medicina (Mex.)* 50(1096):627-631, 1970.

2813 GASTRIC SECRETION WITH PENTAGASTRIN. (Sp.) Valenzuela Casas, E. *Rev. Esp. Enferm. Apar. Dig.* 33(5):539-542, 1971.

2814 THE EFFECT OF INSULIN ON THE SECRETION OF GASTRIC JUICE AND ITS PROTEOLYTIC ACTIVITY AFTER INTRAVENOUS INJECTION OF SADAMINE. (Pol.) Badurski, J. (Med. Acad. Intern. Dis. Clin., Bialystok, Poland) and J. Stasiewicz. *Pol. Tyg. Lek.* 26(9):305-307, 1971.

See also numbers: 2756, 2917, 2921, 3054

2815 ON THE PROBABLE INVOLVEMENT OF A HISTIDINE RESIDUE IN THE ACTIVE SITE OF PANCREATIC LIPASE. (E.) Sémériva, M., C. Dufour and P. Desnuelle (Inst. Biol. Chem., Marseille, France). *Biochemistry* 10(11):2143-2149, 1971.

The maximum rate (Vm) of lipase-catalysed hydrolysis of tributyrin emulsions is under the control of 2 ionizable groups with pK's of 5.8 and 10.1, resp. For Vm to reach its maximal value, the first group with a pK of 5.8 must be unprotonated while the other group must be protonated. Imidazole is the single grouping in proteins whose ionization state varies greatly around pH 5.8. The value of 5000 calories/mole calculated for the ionization enthalpy of the pK=5.8 group is fully consistent with the deionization of an imidazolium ion. The parallel variation of Km and Vm in this pH range indicates that Km is not a true equilibrium constant in the case of lipase. Lipase was photo-oxidized rapidly and completely in the presence of a dye sensitizer according to a first order reaction. Tryptophan, cysteine, methionine, and histidine were modified in the inactivated lipase, suggesting that these groups do not participate in lipase activity or that their destruction only causes partial inactivation. However, the rate constant for photo-oxidation of the second most reactive histidine group is almost the same as the rate constant for inactivation, suggesting strongly that this residue is essential for activity.

2816 PANCREAS ACINAR CELL REGENERATION. VIII. RELATIONSHIP OF ACID PHOSPHATASE AND β-GLUCURONIDASE TO INTRACELLULAR ORGANELLES AND ETHIONINE LESIONS. (E.) Horie, A., T. Takino, L. Herman (State U. New York Downstate Med. Ctr., Brooklyn) and P. J. Fitzgerald. *Am. J. Pathol.* 63(2):299-318, 1971.

Experimental male albino Wistar rats were maintained on 1 of 4 dietetic regimens; stock diet only for 36 days; protein-free diet only for 36 days; protein free diet for 36 days during the initial part of which they received up to 10 daily i.p. injections of 0.7 mg/kg DL-ethionine; and in the last group, up to 10 daily injections of ethionine while on a protein-free diet during the first 10 days, followed by a stock diet without ethionine. Most normal pancreas acinar cells contained minimal amounts of reaction product, usually restricted to prozymogen vacuoles adjacent to the Golgi saccules, or to Golgi saccules and related vesicles. Lysosomes were only rarely seen in normal acinar cells. In both protein-free groups receiving ethionine, at 2 hr after injection there was some reaction product of acid phosphatase and this increased with progression of the degenerative process, peaking 12 days after injection. The ethionine ergastoplasmic lesions resolved more rapidly in those switched to a stock diet than in those who continued on the protein-free diet until sacrifice. The number of observed lesions and the amount of reaction product tended to parallel the changes in the activity of pancreatic homogenate, but this occurred to a far lesser extent with the activity of β-glucuronidase.

2817 THE INTRACELLULAR LOCALIZATION OF KALLIKREIN, TRYPSIN AND AMYLASE IN DOG PANCREAS. (E.) Bhoola, K. D. (U. Bristol Med. Sch., England) and G. Dorey. *J. Physiol. (Lond.)* 214(3):553-570, 1971.

In the present differential centrifugation studies of dog pancreas homogenates, organelles containing the secretory enzymes were mainly associated with mitochondria but were adequately separated from the cytomembranes. The granules containing kallikrein (-ogen), trypsinogen and amylase were mainly recovered on discontinuous sucrose density gradients between 1.7 and 1.775 M sucrose. The biphasic, microsomal-zymogen distribution profile of trypsinogen was a consistent finding and supported a single pathway hypothesis for intracellular localization and transport of a newly synthesized enzyme. This enzyme is channeled into membrane-bound compartments, i.e. the rough endoplasmic reticulum. At the termination of the rough endoplasmic reticulum the enzymes migrate into smooth vesicles which merge with the Golgi complex and transfer their contents to vesicles which mature into the zymogen granules. The electron microscopic appearance of the secretory granules suggest that material contained within the granules is compactly arranged and seem identical with that of the secretory (zymogen) granules seen in situ in the acinar cells of the pancreas. Kallikrein is a serine proteinase like trypsin and chymotrypsin with an ester substrate specificity very similar to that of trypsin. Like these enzymes, kallikrein is secreted into the pancreatic juice, its primary function probably residing in the pancreatic duct or duodenum.

2818 EFFECT OF ATROPINE ON PANCREATIC RESPONSES TO ENDOGENOUS AND EXOGENOUS SECRETIN. (E.) Konturek, S. J. (U. Oklahoma Med. Ctr., Oklahoma City), J. Tasler and W. Obtulowicz. *Am. J. Dig. Dis.* 16(5):385-394, 1971.

Administration of atropine (100 μg/kg/hr i.v.) inhibited maximal pancreatic volume and bicarbonate output by about 70% in dogs with chronic gastric and pancreatic fistulas. A similar degree of inhibition occurred when atropine was given during half maximal and threshold pancreatic secretory responses induced by intraduodenal infusion of acid. Atropine added to secretin infusion caused about 65% inhibition of maximal volume and about 75% inhibition of bicarbonate output. Atropine infused into the duodenum resulted in greater inhibition of the maximal flow rate and bicarbonate output which were induced by acid infusion, than when synthetic secretin was infused i.v. Atropine might also block the endogenous release of secretin from the intestinal mucosa, in addition to its direct effect on pancreatic secretory cells. The release of secretin from the intestinal mucosa might also be under the cholinergic control of local nerves.

2819 THE INFLUENCE OF CHRONIC ADMINISTRATION OF PENTAGASTRIN ON THE RAT PANCREAS. (E.) Mayston, P. D. (London Hosp. Med. Coll.) and J. A. Barrowman. *Q. J. Exp. Physiol.* 56(2): 113-122, 1971.

Following chronic pentagastrin administration (2 mg/100 g body weight/day for 13 days), the weight of the pancreas increased and attributed to an increase in acinar cell size not to an increase in water content of the tissue. Therefore, chronic pentagastrin administration resulted in pancreatic acinar cell hypertrophy. There was no increase in the total amount of nuclear material, while the RNA content of the tissue was increased by a greater proportion than can be accounted for solely by cytoplasmic volume increase. Hence, at the cellular level acinar cells are enlarged, but with nuclei of the same size, and with cytoplasm containing a greater concentration of RNA. The enzyme content of the hypertrophied acinar cells was thought to be the same as that of cells of controls since the total enzyme and total DNA content of control glands and pentagastrin-treated glands were similar. The reduction in the specific activity of the enzymes in the pancreas of pentagastrin-treated animals suggests that, within the cells, the enzymes are diluted by protein other than digestive enzymes. The C-terminal tetrapeptide amide sequence of gastrin and cholecystokinin Try-Met-Asp-Phe-NH_2, may exert a trophic influence upon a number of tissues of the upper gastrointestinal tract.

2820 STRUCTURE AND FUNCTION OF AMYLASES. I. THE SUBUNIT STRUCTURE OF PORCINE PANCREATIC α-AMYLASE. (E.) Robyt, J. F. (Iowa State U. Dept. Biochem. Biophys, Ames), C. G. Chittenden and C. T. Lee. *Arch. Biochem. Biophys.* 144(1):160-167, 1971.

Treatment of crystalline porcine pancreatic α-amylase with dithiothreitol (1.5 mM) at pH 8.5 gave 2 fractions on Sephadex G-100. These 2 subunits had molecular weights of 50,000 and 25,000, respectively. Three enzymatically active fractions (A, B and C) with molecular weights of 25,000, 25,000 and 12,500 were obtained following chromatography on DEAE-cellulose. Treatment with EDTA and dithiothreitol, followed by derivatization with iodoacetamide, converted A and B into very slowly migrating proteins with identical mobilities. Peptide mapping showed that identical peptides were produced from both A and B subunits. The porcine pancreatic α-amylase molecule apparently is composed of 2 similar peptide subunits held together by intermolecular disulfide linkages. Differences in tertiary structure may account for the observed differences between the subunits.

2821 SYNTHESIS AND INTERACTIONS OF CYTOPLASMIC MEMBRANES IN THE PANCREATIC EXOCRINE CELLS. (E.) Meldolesi, J. (U. Milan Dept. Pharmacol., Italy) and D. Cova. *Biochem. Biophys. Res. Commun.* 44(1):139-143, 1971.

At the end of 5 min pulse labeling (^{14}C-L-leucine), a high protein specific radioactivity was found associated with both the rough and smooth microsome membranes in guinea pig pancreatic exocrine cell slices. The ratio of rough to smooth was about 1.3. In rough membranes a consistent decrease of protein specific radioactivity was found after 20 min of chase incubation; between 20 and 80 min there was an additional small decrease, with no further change at 150 min. In smooth microsomal membranes the early decrease of protein labeling was less marked. Between 80 and 150 min but not at 80 min, there was a further moderate decrease. Zymogen granule membrane proteins were practically unlabeled at the end of the pulse. During chase incubation a virtually linear increase of labeling was observed, so that after 150 min the protein specific radioactivity of zymogen granule membranes approached that of smooth microsome membranes. This data suggests that membranes of the rough endoplasmic reticulum and Golgi complex may be synthesized independently of each other while the membranes of zymogen granules derive from preexisting structures, probably membranes of Golgi origin.

2822 THE ASSAY OF HUMAN PANCREATIC PHOSPHOLIPASE A IN PANCREATIC JUICE AND DUODENAL CONTENTS. (E.) Figarella, C. (INSERM Unit Pathol. Dig. Res., Marseille, France) and T. Ribeiro. *Scand. J. Gastroenterol.* 6(2): 133-137, 1971.

Using potentiometric titration of an egg yolk emulsion as substrate human phospholipase A activity was measured. Previous results, that deoxycholate activates and Ca inhibits the above enzyme, were confirmed. Phospholipase A was completely inactive in the absence of deoxycholate, even in the presence of a high concentration of Ca, in pancreatic juice. In duodenal contents, the activity of phospholipase A in the absence of added deoxycholate is probably due to biliary salts naturally present in duodenal juice. Since potential specific activity of prophospholipase A in normal human pancreatic juice is relatively high and the enzyme is stable in duodenal juice, the routine assay of phospholipase A activity in duodenal contents might provide a useful method for the estimation of pancreatic function.

2823 INFLUENCE OF INTRAJEJUNAL GLUCOSE ON PANCREATIC EXOCRINE FUNCTION IN MAN. (E.) Dyck, W. P. (Scott and White Mem. Hosp., Temple, Tex.). *Gastroenterology* 60(5):864-869, 1971.

Intrajejunal glucose significantly depressed pancreozymin- and secretin-induced pancreatic secretory flow and bicarbonate concentration in all 5 subjects studied. The inhibition of pancreatic exocrine secretion, which occurred within the first 10 min of glucose administration and persisted for no more than 30 min, was accompanied by a simultaneous rise in the concentrations of plasma immunoreactive glucagon and insulin. As mean bicarbonate output values returned toward normal, mean plasma immunoreactive glucagon values showed a reciprocal, although slower, decline while mean plasma immunoreactive insulin continued to rise, paralleling the mean plasma glucose gradual elevation. A glucagon-like peptide derived from the intestinal mucosa may serve primarily to regulate the secretin stimulated fraction of bicarbonate-rich fluids.

2824 EFFECT OF DIET ON THE FUNCTION AND MORPHOLOGY OF THE PANCREAS. VII. EFFECT OF FASTING ON OXYGEN CONSUMPTION IN THE RAT PANCREAS IN VITRO. (Cz.) Chorváthová, V. (Res. Inst. Human Nutr., Bratisláva), Z. Kopec and A. Bučko. *Cesk. Gastroenterol. Vyz.* 25(3): 104-108, 1971.

2825 PANCREATIC FUNCTION IN ELDERLY AND SENILE PERSONS. (Rus.) Semichastnova, A. G. and B. S. Lev. *Ter. Arkh.* 42(11):98-101, 1970.

2826 EFFECTS OF TRUNCAL VAGOTOMY ON PANCREATIC FUNCTION. (It.) Patrassi, N. (U. Rome 2nd Surg. Clin.), P. Ciani, M. Simi and M. Carboni. *Gazz. Int. Med. Chir.* 75(24): 1792-1801, 1970.

2827 THE ACTION OF BICARBONATE CO$_2$ BUFFER AND GLYCODIAZINE BUFFER ON CAT PANCREAS SECRETION. (Ger.) Schulz, I. (Max Planck Inst. Biophys., Frankfurt a.M., Germany), F. Strover, B. Kasprik and K. J. Ullrich. *Pfluegers Arch.* 319(3-4):92-93, 1970.

2828 COMPARATIVE STUDY IN MAN OF THE ACTIVITY OF THE DIFFERENT SECRETINS CURRENTLY ON THE MARKET. (Fr.) Ribet, A. (Purpan Hosp., Toulouse, France), J. P. Pascal and N. Vaysse. *Acta Gastroenterol. Belg.* 34(1):9-16, 1971.

2829 PANCREATIC INCORPORATION OF ^{65}Zn AND HISTIDINE ^{14}C INTO SECRETED PROTEINS OF THE PIG. (E.) Pekas, J. C. (U. Tennessee Agric. Res. Lab., Oak Ridge). *Am. J. Physiol.* 220(3):799-803, 1971.

2830 VALUE OF PARENCHYMATOGRAPHY, THE EXOCRINE FUNCTION OF THE PANCREAS, AND THE BLOOD LEVELS OF INSULIN AND GLUCAGON AFTER ADMINISTRATION OF PURIFIED SECRETIN INTO THE CELIAC ARTERY. (Fr.) Plessier, J. (St. Antoine Hosp., Paris). *Acta Gastroenterol. Belg.* 34(1): 143-149, 1971.

2831 INFLUENCE OF STARVATION ON PANCREATIC ACINAR AND DUCTULAR SECRETION IN VOLUNTEERS. (Slovak) Bucko, A. (Res. Inst. Human Nutr., Bratislava, Czechoslovakia), Z. Kopec, M. Ovecka and J. Grunt. *Bratisl. Lek. Listy* 55(2):173-180, 1971.

2832 RADIOSELENIUM IN DUODENAL ASPIRATE AS AN ASSESSMENT OF PANCREATIC EXOCRINE FUNCTION. (E.) Youngs, G. R. (Roy. Free Hosp., London), J. E. Agnew, G. E. Levin and I. A. D. Bouchier. *Br. Med. J.* 2(5756):252-255, 1971.

2833 SEASONAL EXTERNAL SECRETORY FUNCTION OF THE PANCREAS. (Rus.) Rachimov, K. (Acad. Sci. Uzbek Dept. Physiol., Tashkent, USSR) and U. Z. Kadirov. *Fiziol. Zh. SSSR* 57(2): 297-303, 1971.

See also number: 2776

2834 METABOLISM OF SODIUM DEHYDROCHOLATE BY THE RAT LIVER: ITS EFFECT ON MICELLE FORMATION IN BILE. (E.) Hardison, W. G. (Presbyterian-St. Luke's Hosp., Chicago, Ill.). *J. Lab. Clin. Med.* 77(5):811-820, 1971.

The metabolites of dehydrocholate excreted by the rat liver was investigated by means of gas-liquid and thin layer chromatography. Dehydrocholate was altered by hydrolysis alone to produce a number (6) of poorly resolved peaks, one of which had a retention time similar to that of cholic acid. Derivatives migrated similarly to those of cholic acid derivatives on various gas-liquid chromatographic column systems. Following carboxy-^{14}C sodium dehydrocholate administration, analysis of the bile revealed about 10% of the radioactivity appearing in the methyl cholate band, indicating the presence of cholic acid in the bile. Although cholic acid, as its taurine conjugate, can form micelles, it is a minor metabolite of dehydrocholate. Bile salts, extracted from bile of rats infused with dehydrocholate and tested for ability together with lecithin to solubilize cholesterol in aqueous solution, demonstrated a 10-17% efficiency when compared to equimolar solutions of sodium taurocholate. Cholic acid, formed from dehydrocholate, was responsible for most of this micelle-forming capacity. Although dehydrocholate is almost completely metabolized and conjugated by the rat liver before biliary excretion, nonetheless, most of the metabolites form micelles only at high concentrations, one of the metabolites (cholic acid) forming micelles readily.

2835 PERSISTENT REDUCTION OF SERUM BILIRUBIN LEVELS AFTER TREATMENT OF GUNN RATS WITH SOME ACIDIC COMPOUNDS. (E.) Topham, J. C. (Imperial Chem. Indust. Ltd., Macclesfield, Cheshire, England) and R. D. Broad. *Biochem. Pharmacol.* 20(3):718-720, 1971.

Both I.C.I. 54,450 [2-(4-chlorophenyl)thiazo-4-yl acetic acid] at 70 mg/kg body weight p.o. daily for 28 days and salicylate (200 mg/kg body weight) p.o. daily for 26 days, caused an initial fall in serum bilirubin levels (from 10 mg% to 4 mg%) in Gunn rats. This reduction persisted throughout the period of dosing. However, when dosing was discontinued the serum bilirubin levels rose only slightly, to about 6 mg% and were maintained at that level until experiment termination (10 or 17 weeks later). It is unlikely that a direct effect on the albumin binding sites or on the rate of degradation of heme caused the prolonged reduction of serum bilirubin levels as the effect persists well beyond the turnover time for heme or albumin in the rat. The reduction may be due to irreversible stimulation of one of the pathways of excretion already available or the result of activation of bilirubin-uridine diphosphate glucuronyltransferase in the Gunn rat.

2836 METABOLIC CHANGES INDUCED BY TISSUE INJURY: IN VITRO STUDIES WITH RAT LIVER SLICES. (E.) Nitzan, M. (Northwestern U. Med. Sch., Chicago, Ill.) and H. Groffman. *Q. J. Exp. Physiol.* 56(2):108-112, 1971.

Tissue injury (midline laparotomy) specifically and substantially increased the labeling of cholesterol in liver slices taken from fasted rats 24 hr after surgery. The incorporation of ^{14}C from acetate-2-^{14}C and L-alanine-^{14}C was 14-fold and 7-fold greater, respectively in laparotomized rats than in control rats. This striking enhancement in cholesterol radioactivity was sufficient to account for the increased labeling of the total lipids and neutral lipids. Liver slices from injured animals incorporated the labeled alanine into proteins more actively than did slices from control animals. Though the evolution of lactic acid-^{14}C into the suspending medium was also increased after injury, the conversion of L-alanine-^{14}C to glucose and glycogen was not affected and showed a similar pattern in the 2 groups. The present data are compatible with a striking and specific stimulating action of surgical injury upon cholesterogenesis. Apparently both hepatic protein synthesis and peripheral tissue protein catabolism are enhanced following hepatic injury.

2837 EFFECT OF HYPOPHYSECTOMY ON PREGNENOLONE-16α-CARBONITRILE-INDUCED ULTRASTRUCTURAL CHANGES IN RAT LIVER. (E.) Garg, B. D. (U. Montreal Inst. Exp. Med. Surg., Canada), S. Szabo, J. D. Khandekar and K. Kovacs. *Nauyn Schmiedebergs Arch Pharmacol.* 269(1):7-14, 1971.

Hypophysectomy led to a decrease in the size of the liver cells and a considerable loss of periodic acid-Schiff-positive granules. A similar loss of granules also occurred in hypophysectomized rats treated with pregnenolone-16α-carbonitrile. In pregnenolone-16α-carbonitrile-treated rats the rough endoplasmic reticulum was often dilated, irregularly shaped and broken up. The smooth endoplasmic reticulum increased in the form of small vesicles or tubules which were found together with glycogen granules. In the hypophysectomized rats the rough endoplasmic reticulum showed similar changes to the catatoxic steroid-treated animals; however, the smooth endoplasmic reticulum had almost disappeared and the number of glycogen granules were diminished. In hypophysectomized rats treated with pregnenolone-16α-carbonitrile, there was a marked accumulation of smooth endoplasmic reticulum which seemed to have resulted partly from rough endoplasmic reticulum transformation and partly from de novo synthesis. A few glycogen granules in the form of patches were scattered throughout the cytoplasm. This catatoxic steroid agent is apparently capable of inducing smooth endoplasmic reticulum proliferation in the liver, independent of the pituitary action.

2838 ABSORPTION OF OLEIC ACID BY THE GUINEA PIG GALLBLADDER. (E.) Neiderhiser, D. H. (VA Hosp., Cleveland, Ohio), F. M. Pineda, L. J. Hejduk and H. P. Roth. *J. Lab. Clin. Med.* 77(6):985-992, 1971.

Greater then 95% of the instilled oleic acid-1-^{14}C was recovered when the labeled bile solution was removed from the guinea pig gallbladder immediately (zero time), whereas by 3 hrs, only 3% or less of the administered radioactivity was recovered. Between 35% and 46% of the instilled radioactivity could be recovered in respired CO_2 within 6 hr. Radioactivity in the gallbladder wall accounted for about 23% of the amount and in the liver for about 10%. Up to 98% of the radioactivity in the gallbladder wall was found in the extracted lipid fraction, most of the radioactivity being distributed between phospholipids and triglycerides. Samples of venous blood obtained from gallbladders of guinea pigs after oleic acid-1-^{14}C instillation revealed no radioactivity present in the triglyceride or phospholipid fractions, but some was present as unesterified fatty acid. Fatty acids may be absorbed from bile by the gallbladder which could provide a mechanism possibly involved in gallstone formation.

2839 LIVER REGENERATION IN YOUNG AND ADULT RATS AFTER HYPOPHYSECTOMY. (Rus.) Sidorova, V. F. (Inst. Med. Genet., Moscow) and Iu. V. Bardik. *Biull. Eksp. Biol. Med.* 71(4): 93-95, 1971.

Within 1 mo. after hypophysectomy, 66% of the liver was removed from male rats aged 1-1.5 months or 4-5 months. Controls consisted of hepatectomized intact rats and hypophysectomized rats with intact livers in the same age groups. Hypophysectomy significantly retarded liver regeneration in both young and adult rats. Differences in the weights of the liver were present as soon as 25-28 hr after hepatectomy and were still present 7 days after hepatectomy. Hypophysectomy decreased mitotic activity in liver cells of young animals to a greater extent than in the liver cells of adults.

2840 MITOTIC CYCLE IN THE HEPATOCYTES OF THE REGENERATING LIVER. (Rus.) Liozner, L. D. (Inst. Med. Genet., Moscow) and I. V. Markelova. *Biull. Eksp. Biol. Med.* 71(4):99-103, 1971.

After 66% of the liver was removed, adult male CBA mice were injected with ^{3}H-thymidine (0.7 µC/g i.p.) and were sacrificed 9-82 hr later. Demecolcine (5 mg/kg i.p.) was injected 4-5 hr before sacrifice. Mitoses were labeled in 3 waves, indicating that liver cells divided repeatedly. The duration of the mitotic cycle was calculated to be 33-37 hr. The duration of the S-phase was 7 hr; the G_1-phase, 21-25 hr; and the G_2-phase, 5 hr.

2841 CHANGES IN ALKALINE DEOXYRIBONUCLEASE ACTIVITY IN RAT LIVER FOLLOWING PARTIAL HEPATECTOMY. (E.) O'Connor, P. J. (Christie Hosp., Manchester, England). *Biochim. Biophys. Acta* 238(2):186-189, 1971.

Alkaline deoxyribonuclease (deoxyribonucleate oligonucleotidohydrolase; EC 3.1.4.5), an endonuclease, which preferentially hydrolyses native DNA was partially purified from regenerating rat liver. This enzyme demonstrated a 2-fold increase in activity during the regenerative period and remained elevated for at least 70 hr. This increase was not due to a shock reaction. Although alkaline deoxyribonuclease activity was elevated during DNA synthesis in this system, there was no evidence suggesting that an enzyme of this type was essential to DNA synthesis such as the endonuclease described for bacteriophage T_7.

2842 CELLULAR ADAPTATION IN RAT LIVER. II. POLYSOME STRUCTURE AND DNA SYNTHESIS AFTER ALBUMIN DEPLETION AND PARTIAL HEPATECTOMY. (E.) Hill, R. B., Jr. (U. Colorado Sch. Med., Denver) and E. H. Saunders. *Lab. Invest.* 24(4): 325-330, 1971.

Sprague-Dawley rats were subjected to 65% hepatectomy or were administered two 5-U i.p. injections of renin. Only rats that excreted more than 40 g of protein in the urine in the 5-hr period after renin injection were used; excretion in this group was 85 mg. During this period, albumin comprised 75% of the excreted urinary protein and only about 50% of serum protein. Hepatic nuclear uptake of ^{3}H-thymidine was essentially unaltered in rats sham-injected with saline and increased 7-fold in rats injected with renin. At 6-8 hr after either partial hepatectomy or renin injection, both free, bound and total fractions of liver homogenates showed a significant increase in heavy polysomes, being a 20% increase at 10-15 hr. Neither hepatectomy nor renin injection altered the preservation of membrane-bound heavy polysomes after administration of 2 mg/kg actinomycin D. In rats receiving actinomycin D 3-24 hr previously, the rapid disaggregation of free polysomes began immediately in contrast to a 4-hr delay seen in controls. The amount of urinary protein loss in renin-treated rats was not correlated with either the extent of polysome response or uptake of ^{3}H-thymidine. Actinomycin D was not lethal to controls or partially hepatectomized rats when given up to 12 hr after hepatectomy, while 50% of hepatectomized rats receiving actinomycin D 24 hr or more after hepatectomy died within 8 hr. This was not seen with renin.

2843 DEPRESSION OF BILIARY EXCRETION OF INFUSED BILIRUBIN IN RATS AND GUINEA PIGS BY BILE. (E.) Whelan, G. (U. Texas Southwestern Med. Sch., Dallas) and B. Combes. *Am. J. Physiol.* 220(3):683-687, 1971.

nconjugated bilirubin, conjugated bilirubin, and nconjugated bilirubin mixed with fresh rat bile ow in bilirubin content were infused into rats nd guinea pigs and biliary excretion was measured. ddition of bile to infusions of unconjugated ilirubin resulted in a significant fall in the ilirubin tubular maximum (Tm) in both rats and uinea pigs. In rats infused with either un- onjugated bilirubin plus bile, values for bili- ubin Tm in each entire group or each select roup did not correlate significantly with values or plasma bilirubin concentration. The decrease n bilirubin Tm in animals receiving bile in heir infusions was not related to induction of ypotension nor to taurocholate content of the ile. In guinea pigs, bilirubin Tm did not orrelate with the rates of bile flow. Thus, revious conclusions about rate-limiting steps n bilirubin transport based on data obtained in nimals receiving bilirubin infusions containing ile may be incorrect or unwarranted.

844 DOES BILE ACID SECRETION DETERMINE CANALICULAR BILE PRODUCTION IN RATS?

E.) Klaassen, C. D. (U. Kansas Med. Ctr., Kansas ity). *Am. J. Physiol.* 220(3):667-673, 1971.

iliary flow and/or bile acid secretion were ltered in a variety of ways in rats to examine he correlation between bile acid secretion and iliary flow. Biliary flow was decreased by nterruption of the enterohepatic circulation or ypophysectomy, and increased by pretreatment ith phenobarbital. In the rats in which the nterohepatic circulation of bile acids was nterrupted, in the phenobarbital-treated rats, nd in the D-thyroxine-treated rats, there was a ignificant decrease in biliary concentration of ile acids. In the rats receiving exogenous bile cids, there was a marked increase in the biliary oncentration of bile acids. The biliary bile cid concentration, therefore, does not remain onstant, and it appears that bile acid secretion s not the "prime mover" in the initiation of analicular bile flow in rats.

845 PHYSIOLOGIC JAUNDICE: THE ENTEROHEPATIC CIRCULATION OF BILIRUBIN. (E.)

oland, R. L. and G. B. Odell (Johns Hopkins osp., Baltimore, Md.). *N. Engl. J. Med.* 284(1): -6, 1971.

ine full-term infants delivered by cesarean ection were given a formula supplemented with gar for the first 5 days of life starting at the 0th hour, to evaluate the role of the entero- epatic circulation of bilirubin in "physiologic" yperbilirubinemia. The serum bilirubin concen- rations in the 10 control infants rose from a alue at the 13th hour of 4.1 ± 0.5 mg/100 ml to maximum of 7.5 ± 1.4 mg/100 ml on the fourth ay of life. The agar-fed infants had a similar nitial mean serum bilirubin concentration of 4.4 0.9 mg/100 ml, but they showed no increase on subsequent days. The agar-fed infants excreted much more of the total bilirubin eliminated in the first 3 days of life, whereas the control infants demonstrated a progressive increase in the stool excretion of bilirubin until the totals were similar by day 6. Significant differences were found on days 2-4 of life. The reabsorption of bilirubin from the intestine seems to be a major cause of neonatal physiologic jaundice.

2846 FINE STRUCTURAL ASPECTS OF THE MOBILIZATION OF HEPATIC GLYCOGEN. I. ACCELERATION OF GLYCOGEN BREAKDOWN. (E.)

Kotoulas, O. B. and M. J. Phillips (U. Toronto Banting Inst., Ontario, Canada). *Am. J. Pathol.* 63(1): 1-22, 1971.

Relationships between glycogen and organelles in postnatal rat hepatocytes were studied during the phase of rapid mobilization of glycogen and under conditions in which breakdown of glycogen was accelerated. In glucagon-treated animals at both 4 and 6 hr following birth, hyaloplasmic depletion of glycogen was advanced and in many cells complete. In those cells containing residual hyaloplasmic glycogen, the lysosomes and autophagic vacuoles occurred at the margins of the stores of glycogen, as noted in the controls; however, the autophagic vacuoles were predominantly depleted of glycogen (not seen in controls). Morphometric analysis revealed a significant reduction in the volume of glycogen and a marked increase in the volume of lysosomes in glucagon-treated animals. Treating animals with adrenalin resulted in accelerated depletion of glycogen; the autophagic vacuoles were predominantly depleted of glycogen. In puromycin-treated animals, the volume of hyaloplasmic glycogen was reduced and lysosomes showed marked reductions in volume and size. A positive correlation between lysosomal glycogen and hyaloplasmic glycogen was noted and confirmed by morphometric quantitation. Glucagon, which regulates hyaloplasmic glycogen breakdown, also influences lysosomal glycogen metabolism.

2847 FINE STRUCTURAL ASPECTS OF THE MOBILIZATION OF HEPATIC GLYCOGEN. II. INHIBITION OF GLYCOGEN BREAKDOWN. (E.)

Kotoulas, O. B. (U. Toronto Banting Inst., Ontario, Canada), J. Ho, F. Adachi, B. I. Weisgensberg and M. J. Phillips. *Am. J. Pathol.* 63(1):23-36, 1971.

In glucose-treated newborn rats, the appearance of hepatocytes was strikingly different from that of controls since enormous hyaloplasmic stores of glycogen were seen at both 6 and 12 hr following birth. Only a small number of lysosomes, of the autophagic vacuole type, were seen: these were round and usually filled with glycogen. Following the administration of insulin, the volume of hyaloplasmic glycogen was increased, however, there was no difference in the volume of lysosomes. In treated animals, the fraction of the volume of lysosomes that was occupied by the engulfed glycogen was increased. An inhibition of the breakdown of hyaloplasmic glycogen was apparently accompanied by inhibition of the breakdown of lysosomal glycogen. When glucose was administered, the inhibition also was associated with an inhibition of the normal postnatal increase in lysosome volume. Hence, lysosomes seemingly actively participate in the overall breakdown of hepatocellular glycogen in the newborn rat.

2848 STUDIES ON THE ISOLATED PERFUSED PIG LIVER. (E.) Jablonski, P. (Monash U., Melbourne, Australia), M. C. Douglas, E. Gordon, J. A. Owen and J. M. Watts. *Br. J. Surg.* 58(2):129-137, 1971.

The influence of gastroduodenal hormones on hepatic bile flow and the metabolism of BSP was studied by perfusion of the isolated pig liver. Occasional failure of the technique was indicated by increased hepatic arterial blood pressure and decreased total hepatic blood flow. In those livers in which the perfusions were unsuccessful, vasoactive drugs were ineffective in lowering the increased vascular resistance. The addition of low molecular weight dextran to the perfusate was associated with an increase in the success rate. When new tubing was used for each perfusion, and when a less soluble siliconizing agent for the perfusion apparatus was used, similar increases in the success rate were noted. Successfully perfused livers were capable of synthesizing urea and bilirubin, incorporating ^{75}Se-labeled methionine into protein, and conjugating BSP. Unsuccessful perfusions were characterized by a decrease in the uptake of dye from the perfusate and the entry of conjugated BSP into the perfusate.

2849 INFLUENCE OF DIETARY CARBOHYDRATE ON FATTY ACID DISTRIBUTION PATTERNS OF RAT LIVER CHOLESTEROL ESTER. (E.) Lin, M. F. (Nat. Defense Med. Ctr., Taipei, Taiwan), D. W. Wen and K. Liu. *Chin. J. Physiol.* 20(4):243-249, 1970.

The effect of dietary sucrose and starch on fatty acids of cholesterol ester in the liver after short-term and long-term feedings was studied in male rats. Starch-fed rats showed a greater weight gain, lower liver weight and higher nitrogen- and water-content of livers than those on sucrose diets. The amount of total lipids and cholesterol in the liver of sucrose-fed rats was greater than that of starch-fed rats. Sucrose feeding elicited a decrease in the unsaturated essential fatty acids of the cholesterol ester, the degree of change varying with the age of the animal.

2850 EFFECT OF SELECTIVE AND TRUNCAL VAGOTOMY ON INSULIN-STIMULATED BILE SECRETION IN DOGS. (E.) Geist, R. E. and R. S. Jones (VA Hosp., San Francisco). *Gastroenterology* 60(4):566-571, 1971.

The effect of selective and truncal vagotomy on insulin-stimulated bile secretion was studied in 6 dogs to determine if vagal choleresis is primarily due to direct vagal effect on the liver, vagal release of antral gastrin, or both. Insulin (1 U/kg body weight) increased the bile flow rate, chloride concentration and output, and bicarbonate output, but did not increase the bicarbonate concentration. Neither selective hepatic vagotomy nor selective extrahepatic vagotomy had any significant effect on control or postinsulin bile flow rate. Selective hepatic vagotomy was associated with a decrease in chloride output, while selective extrahepatic vagotomy caused a decrease in bicarbonate concentration and output. Following extrahepatic vagotomy, insulin failed to stimulate acid outputs above basal levels. Truncal vagotomy caused a decrease in bicarbonate concentration and output; however, it was also associated with a decrease in bile flow rate and chloride output in response to insulin. Truncal vagotomy completely abolished the insulin-stimulated gastric acid output. An extravagal mechanism seems to be involved in insulin-induced choleresi

2851 THE EFFECT OF DIET AND FASTING ON THE SERUM BILIRUBIN CONCENTRATION IN THE RAT. (E.) Barrett, P. V. D. (Harbor Gen. Hosp., Torrance, Calif.). *Gastroenterology* 60(4): 572-576, 1971.

The effect of fasting, semi-starvation, and a high fat diet on the total serum bilirubin concentration (TSB) was studied in congenitally jaundiced Gunn rats, and the effect of fasting on TSB was studied in normal rats and rats with experimental obstructive jaundice. Semistarvatio and fasting were associated with an increase in TSB in congenitally jaundiced rats. In normal rats and rats with obstructive jaundice, fasting also elicited an increase in TSB. TSB was decreased following a high fat diet, possibly due to an increase in the caloric intake rather than the specific effect of dietary fat. Uridine diphosphate-glucuronyl transferase, which is absent in Gunn rats, seemingly is not involved in the hyperbilirubinemia associated with fasting in these animals.

2852 LIPID PEROXIDATION IN THE VITAMIN E DEFICIENT RAT LIVER. (E.) Wakizaka, A. (Akita U. Sch. Med., Japan) and Y. Imai. *J. Vitaminol.* 17(1):32-38, 1971.

The mechanism of lipid peroxidation of the vitamin E-deficient liver and the normal liver was studied in male rats using exogenous unsaturated fatty acid. A significant decrease of liver tocopherol concentration was observed in the vitamin E-deficient liver even though clinica symptoms of E-deficiency were not observed. The extent of lipid peroxidation in the E-deficient liver was about 4.5 times higher than that in the normal liver. When linolenate was added to the homogenate of normal liver, the rate of peroxidation increased directly with the concentration of linolenate, however, no such relationship was observed in E-deficient livers. The optimal pH for peroxidation was found to be 5.8 in the normal liver homogenate with linolenate, and in the E-deficient livers without linolenate the optimal pH range was 5.8-6.4. In E-deficient liver homogenates without linolenate, the peroxidation rate was increased by NADPH or NADH, inhibited by reduced glutathione (GSH) and NaCN, and hardly affected by ATP. Upon addition of linolenate, the peroxidation rate was increased by ATP, GSH and NADPH, but NADH had only a slight effect, and NaCN inhibited lipid peroxidation.

2853 THE EFFECT OF THE ADMINISTRATION OF L-TRYPTOPHAN ON SYNTHESIS OF UREA AND GLUCONEOGENESIS IN MAN. (E.) Fürst, P. (St. Eriks Hosp., Stockholm, Sweden), G. Guarnieri and E. Hultman. *Scand. J. Lab. Clin. Med.* 27(2): 183-191, 1971.

The effect of L-tryptophan on urea synthesis, hepatic blood flow, and liver metabolism was studied in 3 healthy human subjects who were kept on a carbohydrate-free diet for 3 days. Tryptophan administration was followed by a decrease in both glucose and urea production, and an increase in the production of lactate, pyruvate, α-ketoglutarate, and ammonia in the splanchnic area. L-tryptophan infusion elicited an increase in the production of ketone bodies, and a decrease in the concentration of glutamic acid. L-tryptophan administration seems to inhibit phosphoenolpyruvate carboxykinase which may be the direct cause of the decreased glycolysis, and the indirect cause for the decreased urea synthesis.

2854 PUTRESCINE AND POLYAMINES IN RELATION TO NUCLEIC ACIDS IN MOUSE LIVER AFTER PARTIAL HEPATECTOMY. (E.) Heby, O. (U. Lund Inst. Zoophysiol., Sweden) and L. Lewan. *Virchows Arch.* [*Zellpathol.*] 8(1):58-66, 1971.

The relation of possible polyamine variations to growth, mitosis and nucleic acids during the regeneration of mouse liver was studied. The rate of growth of the regenerating mouse liver was very slow during the first day, but from then on there was a marked increase with 75% of the preoperative liver mass being restored by 140 hr. Few mitoses were noted prior to 20 hr, but thereafter the number increased to a peak between 40 and 50 hr after hepatectomy, when about 3.7% of the nuclei were in mitosis. Putrescine concentration was markedly increased by 13 hr after operation, reaching 187% of the normal value. Spermidine concentration was clearly increased at 20 hr and reached a peak value of 146% of normal at 70 hr. Spermine concentrations decreased towards a minimum of 71% of normal at 70 hr. The most marked changes in nucleic acids were seen in the RNA concentration which increased towards a peak value of 133% of the normal 90 hr after operation. DNA concentration was rather constant during regeneration.

2855 MECHANISM OF ACTION OF RAT LIVER DNA METHYLASE. I. INTERACTION WITH DOUBLE-STRANDED METHYL-ACCEPTOR DNA. (E.) Drahovský, D. (Inst. Biochem. Ther., Frankfurt (Main), Germany) and N. R. Morris. *J. Molec. Biol.* 57(3):475-489, 1971.

As a first step in the methylation process, DNA methylase must bind in some way to DNA. Two types of binding occur: methylase can be loosely bound to DNA in a form dissociable by 0.2 NaCl or tightly bound in a salt-resistant complex. The latter complex is formed at higher temperatures and the temperature curves for enzyme activity follow closely the temperature curves for formation of the tight complex and for the development of salt resistance. Hence, the tightly-bound complex appears to be required for enzyme activity. With tightly-bound enzymes the methylation of high molecular weight DNA is nearly linear for 30 min in the presence of salt. Low molecular weight DNA, under the same conditions, demonstrated nonlinear kinetics which reveal a sharp reduction in the methylation rate with time. Apparently rat liver DNA cytosine-methylase, tightly bound to DNA, accomplishes several methyl group transfers without becoming detached from the DNA and the enzyme thus "walks" (1.5-3.5 base pairs/sec) along the DNA helix.

2856 PARTIAL PURIFICATION AND CHARACTERIZATION OF THE PHOSPHOLIPASE A_2 FROM RAT LIVER MITOCHONDRIA. (E.) Waite, M. (Bowman Gray Sch. Med., Winston-Salem, N. C.) and P. Sisson. *Biochemistry* 10(12):2377-2383, 1971.

Phospholipase A (phosphatide acyl-hydrolase, EC 3.1.1.4), purified 160-fold from rat liver mitochondria catalyzed production of equal amounts of unsaturated fatty acid and 1-acylglycerophosphorylethanolamine from phospholipids. This indicates that the enzyme was specific for the 2 position and was not contaminated with a lysophospholipase. Of the 6 phospholipids used as substrates, the most fatty acids were released from phosphatidylethanolamine at pH 9.5. At pH 7.4, however, phosphatydylserine (an acidic phospholipid) was hydrolyzed to the same extent as phosphatidylethanolamine. Phosphatidylcholine, phosphatidylinositol, phosphatidic acid and cardiolipin were less extensively hydrolyzed. Di-n-octadecyl phosphate (an anionic lipid) doubled the activity of phospholipase A at pH 7.4 but inhibited it at pH 9.5; hexadecyltrimethylammonium chloride (a cationic lipid) stimulated phosphatidylethanolamine hydrolysis 5-fold at pH 7.4. Monoacylglycerophosphorylethanolamine inhibited the reaction. Apparently, phospholipase preferentially catalyzes hydrolysis of those fatty acids in the 2 position that have the fewest double bonds.

2857 GLYCOLYTIC AND GLUCONEOGENIC ENZYME LEVELS IN PRE- AND POSTNATAL PIGS.

(E.) Mersmann, H. J. (Shell Develop. Co., Modesto, Calif.). *Am. J. Physiol.* 220(5): 1297-1302, 1971.

Liver glycogen levels increased in the late prenatal period and were extremely high previous to and on the day of birth in pigs. Pyruvate kinase and phosphofructokinase activities had a minimal value on the day of birth and then increased to reach maximal activity at 14-21 days. The activity of hexokinase did not change throughout the developmental period studied; whereas, glucokinase activity gradually increased during pre- and postnatal periods. Glucose-6-phosphatase activity increased in late fetal life and was substantial at birth. Fructose-1,6-diphosphatase activity was quite low during fetal life, but increased 4-fold by day 2. Pyruvate carboxylase activities did not change while phosphoenolpyruvate carboxykinase activity increased by day 2 from substantial levels in late fetal life and on the day of birth. The potential to utilize gluconeogenesis is markedly enhanced after birth as indicated by the increase in activity of these specific enzymes. A somewhat unique pattern in the development of glycolytic and particularly of gluconeogenic enzymes in the pig was observed compared to other species.

2858 BILIRUBIN TRANSPORT BY LIVER IN ADULT *Macaca mulatta.*

(E.) Gartner, L. M. (Inst. Compar. Biol., San Diego, Calif.), D. L. Lane and C. E. Cornelius. *Am. J. Physiol.* 220(5): 1528-1535, 1971.

The mean maximal rate of cumulative hepatic uptake of bilirubin (34 μg/100 g body weight/min) observed in 9 adult rhesus monkeys over a wide range of serum and liver unconjugated bilirubin concentrations suggests that the process is saturable and not one of simple diffusion. The maximal rate of bilirubin conjugation with bilirubin *in vivo* was approximately 50% of the estimated glucuronyl transferase activity observed *in vitro*. The mean maximal rate of excretion of bilirubin in the rhesus monkey was between 17 and 24 μg/100 g body weight/min. The rate-limiting step in the transfer of bilirubin from blood to bile was that hepatic cellular excretion of conjugated bilirubin in bile exerted no apparent osmotic effect, suggesting either that conjugated bilirubin is sequestered within the bile acid micelle or that it replaces other osmotically-active material in bile. Endogenous bilirubin excretion in the rhesus monkey was about 0.4 μg/100 g body weight/min, a value 25-50% higher than in other animals similarly studied.

2859 IMMUNOLOGICAL RESULTS OF HEPATIC ASSISTANCE PROCEDURES.

(E.) Battersby, C. (U. Queensland Dept. Surg., Brisbane Australia) J. Winch, G. Balderson and W. Burnett. *J. Surg. Res.* 11(4):179-186, 1971.

Livers from hepatectomized pigs were perfused with 8 liters of Hartmann's solution (4° C) and were connected to an isolated perfusion circuit previously primed with heparinized compatible calf blood and gradually rewarmed, after which various hemodynamic parameters were measured. Next, an anesthetized calf was connected to the circuit with calf carotid arterial outflow passing through an extracorporeal flow probe to the pig liver portal vein. Pig liver vena cava outflow was then directed back to the calf or to a disc oxygenator. With this system, metabolic acidosis and hypotension were not observed in the recipient calf. Two calves developed termina pulmonary edema during perfusion and this was attributed not to fluid overload but instead to shock lung resulting from consumption coagulopath Immunodiffusion revealed the presence of pig protein in the calf circulation for up to 14 days following perfusion in 66% of calves. Antipig antibody was never detected, even after subsequent injection of pig protein in the form of pig serum or pig liver extract.

2860 EVIDENCE CONCERNING THE ORIGIN OF LIVER MACROPHAGES.

(E.) Kelly, L. S. (U. California Donner Lab., Berkeley) and E. L. Dobson. *Br. J. Exp. Pathol.* 52(1):88-99, 1971.

The effects of endotoxin, estradiol or glucan stimulation in conjunction with irradiation on the reticuloendothelial system were investigated. Specific liver and spleen irradiation, known to suppress cell division, markedly inhibited stimulation of the reticuloendothelial system by estradiol but failed to affect the stimulation by endotoxin. Estradiol appears to stimulate phagocytic function primarily by proliferation of the reticuloendothelial elements, while endotoxin seems to produce its effect largely by cell activation. Although macrophage population in the liver can be augmented by precursor cells from the bone marrow, the increase observed in estradiol-treated animals could be accounted for by division of littoral cells already resident in the liver at the time of stimulation

2861 HISTONE SYNTHESIS IN THE CHROMATIN IN REGENERATING RAT LIVERS.

(Rus.) Orlova, L. V. (Inst. Biol. Med. Chem., Moscow). *Biokhimiia* 36(2):423-427, 1971.

Incorporation of precursors into histone and DNA in nuclear chromatin of liver cells was studied in male rats after removal of 66% of the liver. ^{3}H-thymidine (30 μC/100 g i.p.) and ^{14}C-glycine (40 μC/100 g i.p.) were injected into the rats 30 min before sacrifice. The rate of histone synthesis increased from 5 times that of nonhepatectomized controls 12.5 hr after hepatectomy to 7.6 times the control value 15 hr after hepatectomy. The rate of DNA synthesis was lower in hepatectomized animals than in controls 12.5 hr after surgery but increased to 3.4 times the control value by 15 hr after surgery. These results indicate that synthesis of histone precedes that of DNA by 1.5-2 hr.

2862 METABOLISM OF CORTICOSTERONE IN THE ISOLATED PERFUSED RAT LIVER. (E.) Eriksson, H. (Karolinska Inst. Stockholm, Sweden) and J.-A. Gustafsson. *Eur. J. Biochem.* 20(2): 231-236, 1971.

The biosynthesis of the metabolites of corticosterone was studied in isolated perfused livers from male and female rats by analyzing hepatic tissue, bile, and perfusate. The main part of the recovered radioactivity (80-90% in all cases) was found in the bile of both male (42%) and female (67%) rats. Only 19% and 15%, resp., of the recovered dose was found in the perfusate. The main part of the radioactivity recovered after perfusion of male rat liver represented free steroids (38%) and steroid glucuronides (39%), whereas in the females the main part of the metabolites were mono- (38%) and disulphusylated (36%). In males, corticosterone was metabolized into 5α-pregnane-3α, 11β, 20β (and 20α), 21-tetrol and 5α-pregnane-3β, 11β, 20β, 21-tetrol. In females, the major metabolites were 3α (and 3β), 11β, 15α, 21-tetrahydroxy-5α-pregnan-20-one and 3α (and 3β), 11β, 21-trihydroxy-5α-pregnan-20-one. This difference in metabolic pathways in male and female rats seemingly accounts in part for sexual differences observed in the urinary and fecal steroid patterns of rats.

2863 HEPATIC KETOGENESIS DURING DEVELOPMENT. (E.) Lee, L. P. K. (U. Toronto Banting and Best Dept. Med. Res., Ontario, Canada) and I. B. Fritz. *Can. J. Biochem.* 49(5):599-605, 1971.

The ketogenic activity in liver preparations from neonatal rats was 50% greater than that obtained in adult rats and about 6 times as great as that seen in liver from 18-day fetal rats. A higher percentage of the ketogenic activity was observed in the extramitochondrial fractions in fetal livers than in adult livers. Carnitine acetyl-transferase activity (CAT) in fetal rat livers was half that obtained in adult rat livers. In neonates, CAT enzyme levels were 2.5 times the values found in adult rats. Ketogenesis rates, when acetate, octanoate, and palmitate were substrates, were, 18%, 15%, and 8% resp., of those obtained in liver preparations from adult rats. In contrast, the high rate of ketogenesis (66%) from octanoylcarnitine in fetal rat livers demonstrates the presence of all enzymes required for β-oxidation of medium-chain length fatty acids. Enzymes involved with ketone body formation remained within mitochondrial particles which had been stripped of their outer membranes.

2864 AN EXPERIMENTAL STUDY OF HEPATIC REGENERATION. (E.) Gupta, R. L. (GSVM Med. Coll., Kanpur, India), R. M. Kudva and V. Bahadur. *Indian J. Med. Res.* 59(2): 219-233, 1971.

Regeneration responses were compared in the remaining rat liver following partial hepatectomy, partial hepatectomy plus testosterone therapy, portal vein ligation, complete vascular occlusion, or hepatic duct ligation in other portions of the liver. The highest regeneration rates were obtained in those rats receiving testosterone followed by partial hepatectomy. Rats with combined vascular ligation of the median and left lateral hepatic lobes showed good response followed by the group that underwent portal branch ligation. Hepatic duct ligation led to minimum hypertrophy of the remaining liver. Macroscopic findings showed that if part of the liver is deprived of its portal supply, complete vascular supply or biliary drainage, atrophy of this hepatic area occurs, associated with simultaneous hypertrophy of the remaining area which retains its function.

2865 TEMPORAL CHANGES IN DNA AND RNA SYNTHESIS IN THE REGENERATING LIVER OF HYDROCORTISONE-TREATED RATS. (E.) Rizzo, A. J., P. Heilpern and T. E. Webb (Ohio State U. Coll. Med., Columbus). *Cancer Res.* 31(6):876-881, 1971.

2866 POST-TRAUMATIC REGENERATION IN LIVER AFTER INTERNAL IRRADIATION. (Rus.) Tokin, I. B. (Inst. Radiat. Hygiene, Leningrad, USSR), G. F. Filimonova and G. N. Merkushev. *Arkh. Anat. Gistol. Embriol.* 59(3):66-73, 1971.

2867 COMPARATIVE LIVER FUNCTION STUDIES IN THE PIG IN VIVO, IN VITRO AND AFTER TRANSPLANTATION. (Ger.) Strebel, H. M. (Univ. Surg. Clin., Bern, Switzerland), J. Bircher, J. Tauber, A. Halpern, M. Weber, E. Scholl, H. Stirnemann and R. Preisig. *Schweiz. Med. Wochenschr.* 101(20):728, 1971.

2868 THE CONTENT AND DISTRIBUTION OF LIPIDS IN THE LIVER IN EXPERIMENTAL THYROIDIN TOXEMIA. (Rus.) Bronshtein, M. E. (Inst. Exp. Endocrinol., Moscow) and A. V. Negovskaia. *Biull. Eksp. Biol. Med.* 71(2):25-27, 1971.

2869 DIETARY DL-METHIONINE AND RAT LIVER ARGINASE ACTIVITY. (E.) Acheampong Mensah, D. K. (U. Guelph Dept. Nutr., Canada) and D. C. Hill. *Can. J. Physiol.* 49(1):84-87, 1971.

2870 HISTOCHEMICAL DETERMINATION OF ISOENZYMES OF LACTIC DEHYDROGENASE. (Rus.) Tsigankov, A. P., L. N. Bandurko and L. B. Tsodikova. *Arkh. Patol.* 33(2):73-76, 1971.

2871 FAILURE TO DEMONSTRATE RETINYL PALMITATE HYDROLASE IN RAT LIVER. (E.) Yeung, D. L. (U. Guelph Coll. Family Consumer Studies, Canada) and M. J. Veen Baigent. *Am. J. Clin. Nutr.* 24(2):172-173, 1971.

2872 THE CONCENTRATION OF METABOLITES IN RAT LIVER FOLLOWING THE APPLICATION OF SORBITOL. (Ger.) Heinz, F. (Med. U., Hannover, Germany) and H. E. Wittneben. *Hoppe Seylers Z. Physiol. Chem.* 351(10):1215-1220, 1970.

2873 PHARMACOKINETICS OF PENTOBARBITAL AND THIOPENTAL IN THE ISOLATED PERFUSED RAT LIVER. (E.) Alvarez, R. A. (U. Nijmegen Sch. Med., Netherlands). *Arch. Int. Pharmacodyn. Ther.* 189(2):380, 1971.

2874 HISTOLOGICAL AND AUTORADIOGRAPHIC INVESTIGATIONS OF CELLULAR REACTION IN LIVER AFTER CATGUT IMPLANTATION. (Ger.) Helpap, B. (U. Bonn Pathol. Inst., Germany) and H. Cremer. *Verh. Dtsch. Ges. Pathol.* 54:268-271, 1970.

2875 THE SIGNIFICANCE OF GLUCURONYL TRANSFERASE OF THE LIVER IN PEDIATRICS. (Ger.) Hohenwallner, W. (Univ. Pediatr. Clin., Innsbruck, Austria), E. Bereitter and H. Berger. *Wien. Klin. Wochenschr.* 82(42-43):744-750, 1970.

2876 METABOLISM OF PHOSPHOLIPIDS IN LIVER MITOCHONDRIA. (Jap.) Akiyama, M. (Sapporo Med. Coll., Japan) and T. Sakagami. *Sapporo Igaku Zasshi (Sapporo Med. J.)* 37(1): 1-12, 1970.

2877 THE USEFULNESS OF ISOLATED LIVER PERFUSION IN THE STUDY OF LIPID METABOLISM. (Sp.) Lemberg, A. (U. La Plata Sch. Med., Argentina). *Medicina (B. Aires)* 30(4): 402-408, 1970.

2878 BILIRUBIN CONJUGATES OF HUMAN BILE: ELIMINATION AS ACYL GLYCOSIDES OF ALDOBIURONIC, PSEUDOALDOBIURONIC AND HEXURONOSYLHEXURONIC ACIDS. (Ger.) Kuenzle, C. C. (U. Zurich Organ. Chem. Inst., Switzerland), J. R. Ruttner and C. H. Eugster. *Helv. Chim. Acta* 53(7):1838-1845, 1970.

2879 SPECIFIC LIVER FUNCTION: HEPATIC VOLUME AS A REFERENCE PARAMETER FOR FUNCTION. (Ger.) Halpern, A. (Univ. Inst. Clin. Pharmacol., Bern, Switzerland), J. Bircher, J. Tauber, R. Blankart, H. Rösler and R. Preisig. *Schweiz. Med. Wochenschr.* 101(20):736-737, 1971.

2880 HISTOCHEMICAL STUDY ON THE GLYCOGEN METABOLISM OF EMBRYONIC LIVER PARENCHYMA CELLS IN VITRO. (Ger.) Neupert, G. (Friedrich Schiller U. Inst. Pathol., Jena, Germany). *Ergeb. Exp. Med.* 1:109-112, 1970.

2881 TESTS OF LIVER FUNCTION IN THE LABORATORY ANIMAL. (Sp.) Vericat Cadesas, F. and M. E. Tornos. *An. Med. (Espec.)* 56(3):258-265, 1970.

2882 THE EFFECTS OF IRON DEFICIENCY ON THE HEPATOCYTE: A BIOCHEMICAL AND ULTRASTRUCTURAL STUDY. (E.) Dallman, P. R. (VA Hosp. San Francisco, Calif.) and J. R. Goodman. *J. Cell Biol.* 48(1):79-90, 1971.

2883 ALTERED RAT HEPATIC DRUG METABOLISM AFTER IMPLANTATION OF A PITUITARY MAMMATROPIC TUMOR (MtT), WALKER CARCINOSARCOMA OR ADENOCARCINOMA AND AFTER REMOVAL OF THE MtT. (E.) Wilson, J. T. (Children's Hosp., San Francisco, Calif.). *Endocrinology* 88(1):185-194, 1971.

2884 ERYTHROPOIETIN AND RENIN RELEASE BY ISOLATED PERFUSED CANINE LIVER-KIDNEY PREPARATION. (E.) Murphy, G. P. (Roswell Park Mem. Inst., Buffalo, N. Y.) and E. A. Mirand. *J. Surg. Oncol.* 3(2):121-130, 1971.

2885 SUPPRESSION OF LIVER DNA SYNTHESIS BY CORTISONE. (E.) Henderson, I. C., R. E. Fischel and J. N. Loeb (Coll. Physicians Surg., New York, N. Y.). *Endocrinology* 88(6): 1471-1476, 1971.

2886 CHANGES OF HEPATIC FUNCTIONS IN OBESE SUBJECTS. (Cz.) Horký, J. (Res. Inst Human Nutr., Prague), R. Rath, Z. Slabochová and L. Blahníková. *Cesk. Gastroenterol. Vyz.* 25(3):98-103, 1971.

2887 METABOLISM OF CYCLOPHOSPHAMIDE BY RAT HEPATIC MICROSOMES. (E.) Sladek, N. E. (U. Minnesota Dept. Pharmacol., Minneapol *Cancer Res.* 31(6):901-908, 1971.

See also numbers: 2710, 2741, 3488

2888 EFFECT OF CYCLOHEXIMIDE ON INTESTINAL SECRETION INDUCED BY HYPERTONIC GLUCOSE. (E.) Halsted, C. H. (Johns Hopkins U. Sch. Med., 3altimore, Md.), D. I. Grayer, E. H. Luebbers, J. H. Yardley and T. R. Hendrix. *Gut* 12(4): 262-267, 1971.

Cycloheximide (20 mg/kg, i.v.) decreased by 50% the fluid response to hypertonic glucose perfusion of one of paired rabbit jejunal loops. In the closed loop preparation, pretreatment with cycloheximide also decreased net fluid production by > 50%. Net and unidirectional Na fluxes into the lumen were significantly decreased in the treated animals. In treated rabbits demonstrating minimal histological alterations there was disappearance of mitotic figures in the crypts of Lieberkuhn and pyknosis and karyorrhexis in ymphoid cells of the lamina propria. Villous epithelium in all treated animals showed, at most, focal reduction in epithelial cell height and scattered basophilic bodies. Glucose absorption was found to be unaffected. A process dependent upon continued protein synthesis (inhibited by cycloheximide) in the crypts may be necessary for the secretory response to an osmotic gradient. However, in contrast to nearly complete suppression of cholera-induced secretion by cycloheximide, the response to an osmotic gradient was limited to only 50%. Therefore, it is thought that an osmotic force probably affects different or additional secretory mechanisms than those operative in cholera-stimulated secretion.

2889 COMPARISON OF MUCOSAL METABOLISM IN THE SMALL INTESTINE OF SPECIFIC PATHOGEN-FREE AND CONVENTIONAL RATS. (E.) Hietanen, E. (U. Turku Dept. Physiol., Finland) and O. Hänninen. *Scand. J. Gastroenterol.* 6(2):127-131, 1971.

Activity of alkaline phosphatase, ATPase, and maltase and the rate of glucuronide synthesis was measured in the small intestines of specific pathogen-free (SPF) rats and normal rats. The mucosal fresh weight/cm segment of the jejunum was significantly higher in the normal controls han in the SPF rats, but in the duodenum and leum no significant differences were observed. he activity of alkaline phosphatase in the uodenum and jejunum of the SPF rats was nearly wice the activity in the normal controls. The ctivity of ATPase and maltase was also higher n the duodenum and jejunum of the SPF rats. altase activity was also elevated in the ileum n SPF rats. The rate of o-aminophenylglucuronide ynthesis was significantly higher in the duodenum f the SPF than of normal rats, as was the ctivity of UDP glucuronyltransferase in the ame region. Microflora may be of importance in he regulation of enzyme levels in the rat small ntestinal mucosa.

2890 ISOLATION AND PROPERTIES OF INTESTINAL HEXOKINASES, FRUCTOKINASE, AND N-ACETYLGLUCOSAMINE KINASE. (E.) Weiser, M. M. (Harvard Med. Sch., Boston, Mass.), H. Quill and K. J. Isselbacher. *J. Biol. Chem.* 246(8):2331-2337, 1971.

Nonspecific hexokinases, fructokinase, and N-acetylglucosamine kinase were isolated from rat intestinal epithelium using diethylaminoethyl column chromatography. Type I and II hexokinases were found to be present in significant amounts, while types III and IV were present in small amounts. Type II proved to be the major hexokinase in the normal rat small intestine, constituting 60% of the total eluted hexokinase activity. In guinea pig intestine, types III and IV were not detected, while there was relative increase in type II hexokinase over type I. Rat type II hexokinase was more resistant to N-acetyl-glucosamine inhibition than guinea pig type II. Hexokinase specific activity of rat intestine was 3 times that of guinea pig intestine. Fifty percent of the total hexokinase activity in both rat and guinea pig intestine was in a particulate form 40% of which could be solubilized by Triton X-100 (0.5%). KCl had a marked inhibitory effect on both soluble and particulate hexokinases, the inhibition being proportional to KCl concentration and partly irreversible. It was found that 0.9 M KCl was able to solubilize particulate hexokinase. KCl also inhibited rat liver hexokinase, liver glucokinase, skeletal muscle hexokinase, and kidney hexokinase. There was no detectable hexokinase activity in purified microvillus preparations.

2891 STUDIES IN VITRO ON FREE AMINO ACID POOLS AND PROTEIN SYNTHESIS IN RAT JEJUNUM. (E.) Fern, E. B. (St. Thomas's Hosp. Med. Sch., London), R. C. Hider and D. R. London. *Eur. J. Clin. Invest.* 1(4):211-215, 1971.

The uptake and incorporation of ^{14}C-leucine in rat jejunum was studied in vitro using everted sacs of rat small intestine, to determine if jejunum synthesizes protein from a source of amino acids distinct from that of the free intracellular pool. The specific activity of L-leucine in the intracellular pool and the concentration of leucine in the tissue rose with time and became approximately constant after 15 min incubation. The appearance of labeled L-leucine in jejunal protein, after a small time lag, proceeded as a linear function for at least 20 min. Studies of uptake and incorporation into mucosal and serosal proteins yielded results similar to those in the whole tissue. Radioactivity incorporated into protein came mainly from the amino acid on the mucosal side of the sac. The pattern of incorporation of ^{14}C-leucine more closely followed a model where the precursor was extracellular than one where the source of amino acid was intracellular. Either the intracellular pool of amino acid is compartmentalized and a small part thereof is used for protein synthesis, or the protein is synthesized from a nonintracellular source of amino acids.

2892 POSSIBLE PRECURSOR OF VITAMIN D STIMULATED CALCIUM BINDING PROTEIN IN RATS. (E.) Drescher, D. and H. F. DeLuca (U. Wisconsin Dept. Biochem., Madison). *Biochemistry* 10(12):2308-2312, 1971.

The formation of Ca-binding protein may not involve new protein synthesis but may result from the conversion of a pre-existing protein (A) into the Ca-binding protein (C). Both visual observation and densitometric tracings of the electrophoretic disc gels revealed that as Ca-binding protein appeared in response to vitamin D in previously induced vitamin D-deficient rats, the A protein decreased in intensity. In dual-label experiments, it was demonstrated that vitamin D brought about a diminution of ^{14}C in the A protein and an inversely proportional increase in ^{14}C in the Ca-binding protein. Perhaps vitamin D and Ca ions in some way stimulate hydrolysis of a peptide fragment from precursor A (of apparently higher molecular weight than the C protein) to yield active Ca-binding protein C.

2893 RELEASE OF INTESTINAL SURFACE-MEMBRANE GLYCOPROTEINS ASSOCIATED WITH ENZYME ACTIVITY BY BRIEF DIGESTION WITH PAPAIN. (E.) Forstner, G. G. (Toronto Western Hosp., Ontario, Canada). *Biochem. J.* 121(5):781-789, 1971.

Density gradient centrifugation of disrupted brush borders indicated that glycoprotein radioactivity, following injection of [1-^{14}C]glucosamine, was distributed identically with sucrose, a plasma membrane marker. Digestion by papain, known to release surface enzyme particles without disruption of the unit membrane, released 90% of the surface sucrase and almost 50% of the brush border glycoprotein and label. Most of the glycoprotein and label emerged as a single peak on Sepharose 4B column chromatography. This peak contained the most actively labeled glycoprotein in the brush border and was closely associated with maltase, sucrase, β-naphthylamidase and alkaline phosphatase. On polyacrylamide gel electrophoresis the peak was partially resolved into 3 bands; each band contained a distinctive enzyme or enzyme pair, and was labeled. The peak material did not demonstrate any periodic acid-Schiff negative protein. Glycoproteins susceptible to brief digestion with papain are therefore closely-linked to released surface enzyme particles, hence, the intestinal surface is covered not by a single type of glycoprotein but by a relatively complex mixture of glycoproteins, each with different functions.

2894 THE EFFECT OF 0°C AND 2,4-DNP ON THE UPTAKE OF MICELLAR FATTY ACID, ON THE EXTRACTION OF ABSORBED LIPID DURING ELECTRON MICROSCOPY PROCESSING, AND ON THE ULTRASTRUCTURE OF EVERTED JEJUNUM. (E.) Buschmann, R. J. (VA West Side Hosp., Chicago, Ill.) and A. B. Taylor. *J. Ultrastruct. Res.* 35(1-2):98-111, 1971.

The effect of metabolic inhibitors (0° C and 2,4-dinitrophenol) on the uptake of micellar fatty acid, on the extraction of absorbed lipid during electron microscopy processing and on the ultrastructure of the jejunum was studied in vitro using everted jejunal sacs obtained from rats. Everted sacs incubated at 0° C or in the presence of 2,4-dinitrophenol took up 74% and 55% less linoleic acid-1-^{14}C, resp., than uninhibited sacs, and esterified much less (approximately 63% versus 89%) lipid. A good correlation existed between the quantity of lipid -^{14}C in the tissues' fatty acid fraction and extraction by the aqueous osmium tetroxide fixative and washes. The amount of absorbed lipid synthesized to glycerides correlated well with the extraction of the lipid by organic solvents, especially propylene oxide and araldite. Metabolically inhibited jejunal cells exhibited dilation of the endoplasmic reticulum, swelling and degeneration of mitochondria, and expanded intercellular spaces when compared with uninhibited controls.

2895 CARBOHYDRATE-RICH COMPOUNDS IN THE COLONIC MUCOSA OF MAN. III. A PRELIMINARY REPORT OF SOME BIOCHEMICAL CHARACTERISTI OF THE CARBOHYDRATE-RICH COMPONENTS IN NORMAL COLONIC MUCOSA. (E.) Korhonen, L. K. (U. Turku Dept. Anat., Finland) and V. Mäkelä. *Histochem. J.* 3(2):101-106, 1971.

After defatting, proteolytic digestion and trichloroacetic acid precipitation of proteins by precipitating the polysaccharides with ethanol and potassium acetate, a trichloroacetic acid-soluble carbohydrate-rich fraction was prepared from the colonic mucosa of man. On electrophores 4 bands of acid mucosubstances containing material were detected, 3 of these reacting with Alcian Blue 8-GX at pH 1.0 and high iron diamine, suggested the presence of sulfate radicals. When the purified polysaccharide material was subjected to methylation, its periodate consumpti rate was more than 4 times greater; this increase probably being due to methanolytic desulfation. The protein content was above 15%, the proteins having the same electrophoretic mobility rates as the acid carbohydrates, thus suggesting that these are bound together as glycoproteins. Hexose, sialic acid, hexosamine, fucose and uronic acid were also present in the sample.

2896 EFFECT OF ORAL ETHANOL ADMINISTRATION ON INTESTINAL CHOLESTEROGENESIS IN THE RAT. (E.) Middleton, W. R. J., E. A. Carter, G. D. Drummey and K. J. Isselbacher (Massachusett

Gen. Hosp., Boston). *Gastroenterology* 60(5): 880-887, 1971.

The rate of cholesterogenesis was significantly greater in both the upper and lower small intestinal slices of rats receiving a large single dose of ethanol compared to controls. Compared with the acute experiments, prolonged ethanol ingestion was not associated with any statistically different rate of intestinal cholesterogenesis. The lymph volume, cholesterol content, and the distribution of cholesterol among the lipoprotein fractions were comparable in animals that had ingested ethanol for 3-4 weeks and controls. In chronic ethanol-treated rats, following intraduodenal administration of ^{14}C-cholesterol, the total amount of cholesterol in the lymph was increased, concomitant with a decrease in the specific activity of lymph cholesterol. Biliary excretion of cholesterol was similar in both control and treated rats. During ethanol infusion in lymph fistula animals, there was a significant shift of cholesterol from chylomicrons to the very low density lipoprotein fraction of intestinal lymph. Ethanol apparently directly affects the intestinal mucosal cell.

2897 THE ORIGIN AND KINETICS OF GOBLET CELLS IN THE HUMAN JEJUNUM DURING IRRADIATION. (E.) Wiernik, G. (U. Oxford, England) and M. Plant. *Br. J. Radiol.* 44(521):348-356, 1971.

Multiple serial biopsies of the jejunal mucosa of patients receiving postoperative irradiation revealed an almost complete inhibition of mitosis in the crypts, while at the same time there was a great increase in both relative and actual number of crypt goblet cells. When sustained mitotic activity was resumed, the percentage of goblet cells in the crypt decreased as the goblet cell moved out of the crypt in groups or cohorts and migrated up the villus to be extruded at its tip. An inverse relationship occurred between the total number of mitoses and the total number of goblet cells following 2 doses of irradiation (800 rads). Apparently, a single stem cell system in the mucosal crypt gives rise to both epithelial and goblet cells, the latter being products of differentiation, not being derived from an independent stem cell population.

2898 THE FINE STRUCTURE OF REGENERATING EPITHELIUM IN THE SMALL INTESTINE. (E.) Pitha, J. (Baylor Coll. Med., Houston, Tex.). *Virchows Arch.* [*Zellpathol.*] 7(4):314-341, 1971.

Occlusion of the superior mesenteric artery was used to produce villous ischemic necrosis of the small intestine. Initial regenerating cells above the crypts and complete reepithelialization were first seen 2 and 4 hr, resp., following necrosis. The mucosa was completely devoid of villi and revealed hyperplastic foci, spurs and synechiae until 8-16 hr. Crypt epithelium showed maximum changes at 2-4 hr which included: coagulation necrosis, presence of cytolysosomes, laminated cellular arrangement and irregular cellular morphology. At 4 hr junctional complexes were formed with frequent irregularities and the first sign of microvillous formation was an elevation of the plasma membrane with fuzzy layer condensation. A consistent feature of the later stages of regeneration (8-24 hr) was a densification of the mitochondrial matrix and accumulation of lipid droplets within well-developed Golgi complexes and within occasional vesicles of endoplasmic reticulum. Early loss of polar organization and cell surface simplification apparently represents dedifferentiation. Differentiation takes place with the progress of regeneration.

2899 THE INFLUENCE OF CORTISONE AND ACTH ON THE BEHAVIOR OF SOME OF THE ENZYMES IN THE EPITHELIAL AND GLANDULAR CELLS OF THE DUODENUM IN THE WHITE RAT. (Pol.) Kilkowska, K. (Med. Acad. Inst. Histol. Embryol., Gdansk, Poland) and K. Kozłowska. *Folia Morphol. (Warsz.)* 30(1):21-32, 1971.

2900 HYPERCALCEMIC ACTION OF DUODENAL EXTRACTS FROM THE RAT. (Fr.) Thomas, J. (Paul Brousse Hosp., Villejuif, France), L. Balan, E. Thomas and A. Monsaingeon. *C. R. Soc. Biol. (Paris)* 164(3):495-497, 1970.

2901 DUODENAL FERRITIN SYNTHESIS IN IRON REPLETE AND IRON DEFICIENT RATS: RESPONSE TO SMALL DOSES OF IRON. (E.) Brittin, G. M. (U. Texas M. D. Anderson Hosp. Tumor Inst., Houston) and D. Raval. *J. Lab. Clin. Med.* 77(1): 54-58, 1971.

2902 THE EFFECT OF INSULIN AND INSULIN DEFICIENCY ON THE TRANSPORT AND METABOLISM OF GLUCOSE BY RAT SMALL INTESTINE. (E.) Leese, H. J. (Imperial Coll. Dept. Biochem., London) and K. R. L. Mansford. *J. Physiol. (Lond.)* 212(3):819-838, 1971.

2903 DNA, RNA AND PROTEIN CONTENT OF THE SMALL BOWEL OF THE RAT AS A FACTOR OF AGE. (Ger.) Hellthaler, G. (Karl Marx U. Dept. Gerontol., Leipzig, Germany), H. Kohler and W. Rotzsch. *Z. Alternsforsch.* 23(2):139-144, 1971.

See also numbers: 2740, 2748, 2789, 2790, 2822, 2894

2904 CONTROL OF GASTROINTESTINAL FUNCTION. (E.) Brooks, F. P., New York, MacMillan Co., 1970. 222p. $5.95 Soft Cover.

A review of gastrointestinal physiology with an emphasis on control mechanisms. There are 16 chapters in the major areas of secretion, digestion, absorption and motility. Individual chapters include discussions of structure, growth and development, cellular function and control at the cellular level as well as that mediated through the visceral nervous system and endocrine glands. Brief summaries of the significance of the specific digestive functions in humans and of pathophysiologic interest conclude each chapter. The final chapter applies system analyses to the enterohepatic circulation of bile salts. References are extensive, primarily from 1965 to 1969. There are 55 line drawings and illustrations. The book was intended as an introductory text to gastrointestinal physiology for medical students and a review of basic physiology for more advanced students, house officers and practicing physicians.

2905 THE EFFECTS OF ACUTE GASTRIC DISTENSION ON CARDIAC OUTPUT AND RELATED FUNCTIONS OF DOG. (E.) Satpathy, N. K. (SCB Med. Coll. Dept. Physiol., Cuttack, India), B. Das and R. K. Das. *Indian J. Physiol. Pharmacol.* 14(3):145-154, 1970.

In all dogs studied gastric distension was always associated with a fall in the mean femoral arterial pressure. At a distension pressure of 30-40 mm Hg, the cardiac output was increased (7%) in 5 dogs, whereas distension of the stomach at 45-50 mm Hg or 60-70 mm Hg was associated with a 50% fall in cardiac output. Whenever the intragastric pressure was increased, the abdominal inferior venacaval pressure rose promptly after a lapse of 40-60 sec. At the lowest gastric distension pressure, peripheral vascular resistance declined in the 5 dogs who had shown an increase in cardiac output at this same pressure. At the higher gastric distension pressures, the mean value for peripheral vascular resistance rose above the resting level. The percentage fall in arterial blood pressure at gastric distension pressure 30-40 mm Hg was more after vagotomy than before; however, there was no difference noted at 60-70 mm Hg. Also, at the low gastric distension pressure, the rise in peripheral vascular resistance over the resting value was proportionately much less after vagotomy than before.

2906 HETEROLOGOUS ANTISERUM AGAINST GASTRIC PARIETAL CELLS INDUCED BY SUB-MICROSOMAL GASTRIC MUCOSAL FRACTION. (E.) Ward, H. A. (Monash U. Med. Sch., Prahran, Victoria, Australia), R. C. Nairn and W. G. R. M. De Boer. *Chir. Exp. Immunol.* 8(3):461-466, 1971.

The centrifuged sediment resulting from dialysis of a solution obtained by 6 M-urea extraction of bovine gastric (abomasum fundus) mucosa microsomal fraction was suspended in buffered saline (0.145 M NaCl, 0.01 M sodium phosphate, pH 7.1) and injected into 2 female New Zealand rabbits at a dose of 0.13 N/kg. They were injected at 4 i.m. sites with 1 ml of antigen suspension emulsified with 1 ml Freund's complete adjuvant and containing 100,000 U sodium penicillin G and 50 mg streptomycin sulfate and this was repeated after 4 weeks. Immunofluorescence after serum absorption by tissue homogenates revealed production of autoantibodies to components of gastric mucosa, especially to the cytoplasm of parietal cells. Only the IgG fraction of the antiserum was involved. Complement fixation occurred with the antiserum and was decreased by absorption with small bowel tissue and was inhibited only by absorption with gastric tissue. Precipitin activity noted in the serum was probably due to a gastrointestinal antigen other than the gastric parietal cell autoantigen.

2907 HEAT PRODUCTION IN THE GASTRO-INTESTINAL TRACT OF THE DOG. (E.) Durotoye, A. O. (U. Toronto Dept. Physiol., Ontario, Canada) and J. Grayson. *J. Physiol. (Lond.)* 214(3):417-426, 1971.

All parts of the gastrointestinal tract except the rectum were hotter than the aorta (mean temperature: 35.2 °C) by the following amounts: stomach, 0.45°C; duodenum, 0.60°C; ileum, 0.53°C; and large intestine, 0.48°C. Portal vein, liver and hepatic veins had higher temperatures than the aorta. Since the experiments were performed on dogs fasted for 24 hr, active transport was largely excluded as a possible contributory factor to increased gastrointestinal heat production. Atropine, adrenergic neuronal blockade, vagotomy or bowel sterilization had no effect on temperature changes or temperature distribution in the gastrointestinal tract. Hence, smooth muscle activity, secretory activity or microbiological activity are not among the source(s) of gastrointestinal heat production. Mucosal activity was the most likely source of heat; however, oxidative mechanisms alone were shown not to be sufficient heat sources. Apparently, since the rectal temperature was similar to the aortic temperature, the rectum is metabolically inactive and passively assumes the temperature of its blood supply.

2908 THE EFFECT OF GLUCOSE AND INSULIN ON PANCREATIC BLOOD FLOW IN THE ANESTHETIZED PIG. (E.) Semb, L. S. (Ulleval Hosp., Oslo, Norway) and S. Aune. *Scand. J. Clin. Invest.* 27(2):105-111, 1971.

The effect of i.v. glucose, and i.v. insulin on pancreatic blood flow (PBF) was studied in 7 fasted pigs using the hydrogen clearance technique. PBF increased shortly after the infusion of 5% glucose had started, reaching peak values of 80-140 ml/min 100 g (up to 300% of control values). Peak flow occurred either before or at the same time as blood sugar concentration attained maximal values. Infusion of 5% mannitol or 0.9% NaCl had no effect on PBF apart from an expanding effect in the circulation seen in some of the experiments. Large doses of insulin (0.5-1.0 IU/kg body weight) reduced PBF in the course of 10-15 min, while blood sugar was still above the resting values.

2909 ANIMAL EXPERIMENTS ON DIGESTION-REGULATING PROPERTIES OF Haronga madagascariensis. I. EFFECT ON THE NUCLEIC ACID AND PROTEIN CONTENT OF THE LIVER, PANCREAS, DUODENAL EPITHELIUM, AND KIDNEYS IN MICE. (Ger.) Kemény, T. (WHO, POB 9292, Dar es Salaam, Tanzania). *Arzneim. Forsch.* 21(1):101-104, 1971.

Extracts of Haronga madagascariensis were fed to adult male BALB/c mice so that they constituted 3, 5, or 20% of the diet for 6 (acute) or 45 (subacute) days or for 9 months (chronic). Neither acute, subacute, or chronic administration of H. madagascariensis had any effect on food intake, body weight, or organ weight but esterase activities were increased in the pancreas, liver, kidneys, and duodenal epithelium. Both acute and subacute administration of these extracts significantly reduced the number of zymogen granules in the pancreas and significantly increased the RNA content of the pancreas and duodenal epithelium without changing the DNA content of these organs. Acute administration of extracts also increased the protein content of the duodenal epithelium and pancreas.

2910 IMMUNOFLUORESCENT LOCALIZATION OF ENTEROGLUCAGON CELLS IN THE GASTROINTESTINAL TRACT OF THE DOG. (E.) Polak, J. M. (Roy. Postgrad. Med. Sch., London), S. Bloom, I. Coulling and A. G. E. Pearse. *Gut* 12(4):311-318, 1971.

Immunofluorescent demonstration of enteroglucagon cells was obtained solely with tissue (obtained from the gastrointestinal tract of dogs) fixed in carbodiimide, and cut in the cryostat after washing. All regions of the stomach and intestine (except pylorus and duodenum) contained enteroglucagon cells, which were most numerous in the fundus and in mid- and terminal jejunum. Cells closely resembling pancreatic α_2 cells were found in both fundic and midjejunal mucosa. These cells contained round, densely osmiophilic granules with a diameter of between 200 and 300 millimicrons. In the fundus they apparently represented the A cells of the Wiesbaden terminology, while in the jejunum they are regarded as the large granule cells (L) of the same terminology. Cytochemical correlations between the pancreatic α_2 cell and the enteroglucagon cell were observed with regard to argyrophilia and indole group reactivity. The ability to demonstrate enteroglucagon in its storage form in the enteroglucagon cell should facilitate studies on the response of the latter to different stimuli.

2911 THE HEPATIC OUTFLOW TRACT IN DOGS. (E.) Schon, G. R. (U. Puerto Rico Dept. Surg., San Juan) and R. Labat. *Surgery* 69(5):748-754, 1971.

The effects of isoproterenol, and phenoxybenzamine followed by L-norepinephrine on liver weight, hepatic lymph production, portal vein flow, and hepatic arterial flow were measured in 23 isolated perfused dog livers. Perfusion caused a marked reduction in liver blood flow with concomitant gain in weight and increase in lymph production indicating a postsinusoidal block. Beta-adrenergic stimulation caused a dilation of the postsinusoidal sphincter as revealed by increases in liver blood flow and weight gain and a decrease in lymph production. Isoproterenol was about 4 times more effective than L-norepinephrine in effecting the sphincteric dilation. The administration of beta-adrenergic stimulators seemingly improves dog liver perfusions by dilation of the postsinusoidal constriction.

2912 AN EFFECT OF DEOXYCORTICOSTERONE UPON THE ILEUM SIMULATING COMPENSATORY HYPERTROPHY OF THE GUT. (E.) Tilson, M. D. (Yale U. Sch. Med., New Haven, Conn.), S. Phillips and H. K. Wright. *Surgery* 69(5): 730-735, 1971.

Experimental rats received 7 daily s.c. injections of either 0.020 U pitressin tannate in 0.5 ml sesame oil or 1 mg of deoxycorticosterone acetate (DOCA) in 0.5 ml of sesame oil, while controls received an injection of 0.5 ml sesame oil or no injection at all. Following the last injection, rats received a single i.p. injection of ^{3}H-thymidine and ileal biopsies were taken 18 hr later. The length of ileal villi and ileal cell migration rate in rats receiving DOCA were significantly greater than in all other groups; the difference in villus length at 9 and 27 cm proximal to the ileocecal junction did not differ significantly from that at 3 cm. The length of ileal and jejunal villi was not significantly less in K^+-depleted rats than in rats receiving supplemental KCl; however, the K^+-depleted group showed a significant increase in mean weight of the right kidney. Everted sacs of ileum from DOCA-treated rats showed a significant increase in their absorptive capacity for water as measured by sac weight gain and mucosal fluid transfer per g dry weight. Mucosal scrapings from DOCA-treated rats showed a significant 28% increase in the Na^+-K^+-ATPase activity and a nonsignificant 5% increase in Mg^{++}-ATPase activity.

See also number: 2848

2913 HYPOTONIC DUODENOGRAPHY. (E.) Kihara, T. (Okayama U. Med. Sch., Japan), A. Ohta, Y. Ishihara and M. Morita. *Clin. Radiol.* 22(2):251-254, 1971.

Hypotonic duodenography with the administration of Prifinium bromide (PFB) was performed on 111 subjects with papillary carcinoma, carcinoma of the head of the pancreas, or biliary or other pancreatic disease and 9 normal controls, all of whom had undergone routine X-ray examination of the stomach and duodenum. In all of the 9 controls, a decrease in duodenal tone and disappearance of peristaltic waves were confirmed using this technique. The walls, circular folds and frenulum of the duodenum were demonstrated in detail. Filling defects were clearly visible in patients with papillary carcinoma of the duodenum, carcinoma of the head of the pancreas, and duodenal carcinoma. No complications were encountered in these studies.

2914 BLEEDING FROM ESOPHAGEAL VARICES IN CIRRHOSIS OF THE LIVER: HEMODYNAMIC AND RADIOLOGICAL CRITERIA FOR THE SELECTION OF POTENTIAL BLEEDERS THROUGH HEPATIC AND UMBILICOPORTAL CATHETERIZATION STUDIES. (E.) Joly, J. G., D. Marleau, A. Legare, P. Lavoie, J. Bernier and A. Viallet (St. Luke Hosp., St.-Denis, Montreal, Quebec, Canada). *Can. Med. Assoc. J.* 104(7):576-580, 1971.

The portohepatic gradient (free portal venous pressure - free hepatic venous pressure) was used as an index of portal hypertension. The coronary vein was evaluated for varices and graded 1+ to 4+ in 38 compensated cirrhotics. Eighteen subjects had varices grades as 3+ and 4+ and included 8 patients who bled from esophageal varices. These 18 subjects had had portohepatic gradients of 10 mm Hg or more, and, taken as a group, showed significantly higher portohepatic gradients than 20 other cirrhotics none of whom bled from any sources and whose coronary vein involvement graded as 1+ or 2+. There was also a highly significant correlation between coronary vein involvement and the portohepatic gradient. It seems probable that radiological and hemodynamic data obtained by combined hepatic and umbilicoportal catheterization in patients with cirrhosis can be a valuable help in the selection of potential bleeders.

2915 ANGIOGRAPHY AFTER END-TO-SIDE PORTACAVAL SHUNT. CLINICAL, LABORATORY, AND PHARMACOANGIOGRAPHIC OBSERVATIONS. (E.) Bookstein, J. (U. Michigan Med. Ctr., Ann Arbor), E. Boijsen, T. Olin and J. Vang. *Invest. Radiol.* 6(2):101-109, 1971.

Celiac angiograms were performed on 10 patients with hepatic cirrhosis before and after end-to-side portocaval shunts were constructed to evaluate the anatomic and hemodynamic sequellae of the surgery. The hepatic arteries were generally enlarged on pre- and especially postoperative arteriograms when compared to normal patients. The size and/or number and tortuousness of intrahepatic arterial branches was increased over normal controls, especially in postoperative studies. Arterial collateral flow from the superior mesenteric artery increased in postoperati patients. Postoperatively, the size of the liver and spleen was decreased, and the density of the hepatogram and arterioportal flow increased. Central or peripheral arterioportal communications were observed in 3 dogs in which end-to-side portocaval shunts were constructed.

2916 A NEW TEST FOR COMPLETE NERVE SECTION DURING VAGOTOMY. (E.) Grassi, G. (St. Giovanni Hosp., Rome). *Br. J. Surg.* 58(3): 187-189, 1971.

Various experiments undertaken on 28 duodenal ulcers proved that the study of pH by means of a glass electrode applied directly to the gastric mucous membrane during anesthesia could induce a valid stimulation of acid-secreting gastric cells when the vagi were intact. In 40 additional patients the test demonstrated a completed denervation as revealed by pH values between 5.5-7.0 on the whole mucous gastric surface in 36 patients, while in 4 patients, the presence of a limited zone of gastric mucosa with a pH 1.2-2.0 surrounded by mucosa pH 5.5-7.0 showed not only an incomplete vagotomy but also, on the basis of their localization on the wall of the stomach, whether the unsectioned branches were anterior or posterior. Up to 1 year after the operation, values found after maximal histaminic tests were similar to those found during surgery. Hollander's test confirmed the completeness of vagal section in all cases.

2917 A USEFUL SPECTROPHOTOMETRIC RATE ASSAY FOR PEPSIN. (E.) Stein, T. P. (U. Pennsylvania Sch. Med., Philadelphia), T. W. Reid and D. Fahrney. *Anal. Biochem.* 41(2): 360-364, 1971.

The pepsin-catalyzed hydrolysis of phenyl sulfite can be monitored at 270 millimicrons. The rate of increase of absorbance at 270 millimicrons is a linear function of enzyme concentration. A final concentration of (0.3-3.0) x 10^{-6} M pepsin is optimal for 5 min assay periods with a Gilford recording spectrophotometer. Values of the steady-state kinetic parameters for sulfite ester hydrolysis were obtained with a homogeneous sample of pepsin and represented the highest specific activity observed to date. These results indicate that the kinetic properties of commercial pepsin differ little from those of homogeneous pepsin. Phenyl sulfite is superior to peptide substrates in its ease of synthesis and its ability to be spectrophotometrically monitored.

2918 EFFECT OF SECRETIN AND PANCREOZYMIN ON SELECTIVE CANINE PANCREATIC ANGIOGRAPHY. (E.) Kupic, E. A. (U. Vermont Coll. Med., Burlington). *Invest. Radiol.* 6(2):133-140, 1971.

Vessel size and flow time were measured in some of the arteries surrounding the pancreas in 20 dogs before and after the administration of secretin and/or pancreozymin using selective celiac and mesenteric angiography. There was little difference in the average size of the hepatic, splenic, or pancreaticoduodenal arteries, or pancreaticoduodenal vein between uninjected controls, and animals injected with either hormone, whether the celiac artery was injected alone or when both celiac and superior mesenteric arteries were injected simultaneously. When both vessels were injected simultaneously, however, there was a definite decrease in all flow times compared to the celiac studies even though the injection pressure remained constant and the total amount of contrast material was slightly increased. After hormone injection into both vascular beds, there appeared to be a further and significant reduction in flow time through the pancreaticoduodenal system, although little change from baseline was visualized in the mesenteric system. Following the injection of hormones, the pancreaticoduodenal and portal veins were almost always visualized more clearly.

2919 UTILIZATION OF SOLUBILITY OF α-FETOPROTEIN IN 34% AMMONIUM SULFATE IN THE PREPARATION OF ANTISERUM AND ITS TEST. (E.) Nishioka, M. (Yamaguchi U. Sch. Med., Obe, Japan), T. Ibata, K. Miyazato, K. Okita and T. Fujita. *Digestion* 4(2):65-71, 1971.

Rabbits were immunized with a supernatant soluble in 34% saturated ammonium sulfate of serum from a patient with primary liver carcinoma, to obtain antiserum specific for α-fetoprotein. The α-fetoprotein test was done in 153 patients with hepatic diseases. The test was positive in 14 of 16 patients with primary hepatic carcinoma. One of 2 patients who showed a negative test, had cholangiocellular carcinoma. Three of 38 patients with liver cirrhosis gave a positive test, one of the patients being revealed to have hyperplastic nodules on liver biopsy. The α-fetoprotein test is a highly useful tool in the diagnosis of primary hepatocellular carcinoma.

2920 GASTROGRAFIN AS AN AID TO THE DIAGNOSIS OF PERFORATED PEPTIC ULCER. (E.) Wellwood, J. M. (Roy. Hosp., Wolverhampton, England), A. N. Wilson and B. R. Hopkinson. *Br. J. Surg.* 58(4):245-249, 1971.

In a series of 64 patients with suspected perforated peptic ulcers, 84% were assessed correctly by clinical means alone on admission. However, 84% of perforations could be suspected following radiographic assessment for pneumoperitoneum and Gastrografin leaks. Pneumoperitoneum alone was visible in only 61% and leaks of Gastrografin were found in only 50% of the patients with perforated ulcer. Hence the use of both of these radiological procedures gave a considerably higher pick up rate than did either independently. A leak of Gastrografin indicated that the perforation is still patent, but the presence of a pneumoperitoneum gave no information on this matter. Other information obtained from the Gastrografin meals included the diagnosis of pyloric stenosis in 4 patients. In addition, the site of the perforation, whether gastric or duodenal, was indicated in many patients.

2921 A SIMPLE AND ECONOMICAL METHOD FOR DETERMINING GASTRIC ELECTROLYTE SECRETION. (Sp.) Meeroff, J. C. (Metropol. Sanit., Cangallo, Peru). *Rev. Esp. Enferm. Apar. Dig.* 34(2):149-164, 1971.

2922 HYPOTONIC DUODENOGRAPHY AND SIMULTANEOUS CHOLANGIOGRAPHY. THEIR DIAGNOSTIC VALUE. (Sp.) Alonso Mallo, G. (Alicante, Spain), A. Gomez Andres and A. Pascual Mejias. *Rev. Esp. Enferm. Apar. Dig.* 33(6):719-722, 1971.

2923 EFFECTIVE 24-HOUR PREPARATION FOR RADIOLOGIC EXAMINATION OF THE COLON. (E.) Zezulin, W. *Surg. Clin. North Am.* 51(3): 799-805, 1971.

2924 ULTRASONIC DIAGNOSIS OF RETROPERITONEAL PROCESSES. (Ger.) Engelhart, G. J. (Univ. Med. Clin., Basel, Switzerland). *Schweiz. Med. Wochenschr.* 101(20):745-747, 1971.

2925 INVESTIGATING A NEW ICG DYE (VERDI-TEST) FOR THE USE IN DYE EXCRETION TESTS OF LIVER FUNCTION. (Ger.) Brühl, W. (Lubeck Med. Acad., Germany), E. Schmid, A. Wagner and U. Ritter. *Z. Gastroenterol.* 9(3):166-170, 1971.

2926 A METHOD FOR THE DETERMINATION OF BILIARY VOLUME BY MEANS OF INDOCYANINE GREEN. (Ger.) Maurer, C. (Univ. Surg. Clin., Heidelberg, Germany) and B. Meier. *Z. Gastroenterol.* 9(3):159-165, 1971.

2927 CALORIMETRY IN PARTIAL AND TOTAL GASTRIC RESECTION: METHODOLOGY. (Ger.) Fischer, R. (Stuttgart-Bad Cannstatt Hosp., Germany) and H. U. Benz. *Z. Gastroenterol.* 9(3):143-151, 1971.

2928 ADVANCES IN ABDOMINAL ANGIOGRAPHY. (Sp.) Stoopen, M. (IMSS Gen. Cent. Hosp., Mexico City, Mexico), G. Flores Izquierdo and L. Landa. *Arch. Inst. Cardiol. Mex.* 40(4): 401-416, 1970.

2929 HEPATOGRAPHY WITH INTRASPLENIC INJECTION OF ULTRAFLUID LIPIODOL. TECHNICAL NOTE. (Fr.) Serres, J. J., M. Bouvry and C. Lesquerre. *Ann. Univ. Abidjan. Med.* 4:117-118, 1970.

2930 HISTOLOGICAL LIVER PUNCTURE DIAGNOSIS. (Ger.) Noeske, K. *Aerztl. Prax.* 22(87):4726-4728, 1970.

2931 INDICES OF INTRAGASTRAL ENDORADIOPROBING pH IN HEALTHY INDIVIDUALS AND IN PEPTIC ULCER. (Pol.) Chernobrovii, V. N. *Ter. Arkh.* 42(7):40-43, 1970.

2932 HYDATID CYST OF THE LIVER LOCALIZED BY SELECTIVE CELIACOGRAPHY. (Fr.) Fontaine, R. (CHU Surg. Clin. A, Strasbourg, France), J. L. Mousson, J. L. Fontaine and J. Tongio. *J. Radiol. Electrol. Med. Nucl.* 51(11): 643-644, 1970.

2933 CHANGES IN LIVER AND SPLEEN SCANS OF PATIENTS DURING TREATMENT WITH TWO HYPOLIPIDEMIC DRUGS. (E.) Dujovne, C. A. (Johns Hopkins U. Dept. Med., Baltimore, Md.) and H. W. Strauss. *Radiology* 98(3):682-684, 1971.

2934 AN EVALUATION OF THE 'CLEAN COLON' TECHNIQUE. (E.) Tracht, D. G. (St. Vincent's Hosp., New York, N. Y.) and A. R. Clemett. *Radiology* 99(1):69-70, 1971.

2935 COMPARATIVE SENSITIVITY OF COMPLEMENT FIXATION, COUNTERIMMUNOELECTROPHORESIS, RADIAL, AND DOUBLE DIFFUSION FOR DETECTION OF AUSTRALIA ANTIGEN. (E.) Holper, J. C. (Abbott Sci. Products Div., South Pasadena, Calif.) and A. Jambazian. *Transfusion* 11(3):157-161, 1971.

2936 CONTROL OF COMPLETENESS OF VAGOTOMY FOLLOWING STAINING OF THE VAGUS FIBERS. (Ger.) Maurer, W. (Dist. Hosp., Solothurn, Switzerland), J. Laissue, G. Miller and R. Berchtold. *Schweiz. Med. Wochenschr.* 101(20): 751-752, 1971.

2937 COMPARATIVE ASSESSMENT OF VAGOTOMY WITH THE 2-DEOXY-GLUCOSE TEST AND THE INSULIN TEST. (Ger.) Stalder, G. A. (Univ. Med. Polyclin., Basel, Switzerland), H. R. Schultheiss and M. Allgöwer. *Schweiz. Med. Wochenschr.* 101(20):749-750, 1971.

2938 A NEW METHOD OF DETERMINING THE LEVEL OF ANAL AND RECTAL ATRESIA USING ULTRASOUND. (Ger.) Willital, G. H. (Univ. Surg. Clin., Erlangen/Nuremberg, Germany). *Z. Kinderchir.* 8(4):395-398, 1970.

2939 COMPUTERIZED X-RAY DIAGNOSIS OF EARLY FUNCTIONAL GALLBLADDER PATHOLOGY. (Rus.) Krugliakov, I. O., V. A. Kulikov and G. V. Klivak. *Sov. Med.* 34(1):17-20, 1971.

2940 INCIDENCE AND SIGNIFICANCE OF SPLEEN AND BONE MARROW UPTAKE IN HEPATIC SCINTIGRAPHY WITH RADIOCOLLOIDS. (It.) Manduca, A. (U. Naples Inst. Gen. Clin. Med., Italy), S. Gentile and M. De Gaetano. *Rass. Int. Clin. Ter.* 51(1):1-10, 1971.

2941 A RADIOLOGICAL SIGN IN THE DIAGNOSIS OF ENTEROGENOUS CYSTS. (E.) Livingston, P. A. (Columbia-Presbyterian Med. Cent., New York, N. Y.), E. J. Pollock, W. A. Renert and W. B. Seaman. *Radiology* 98(3): 543-545, 1971.

2942 COMPARISON OF METHODS FOR ACCELERATION OF SMALL INTESTINAL RADIOGRAPHIC EXAMINATION. (E.) Goldstein, H. M. (Univ. Sch. Med., Stanford, Calif.), G. J. Poole and C. J. Rosenquist. *Radiology* 98(3):519-523, 1971.

2943 GALACTOSE ELIMINATION CAPACITY. A RELIABLE TEST FOR QUANTITATIVE DETERMINATION OF LIVER FUNCTION. (Ger.) Heri, M. (U. Bern Inst. Clin. Pharmacol., Switzerland) and J. Bircher. *Schweiz. Med. Wschr.* 101(20): 735-736, 1971.

2944 DELETERIOUS EFFECTS OF GASTROINTESTINAL CONTRAST MATERIAL ON ABDOMINAL ECHOGRAPHY. (E.) Leopold, G. R. (U. California, San Diego) and W. M. Asher. *Radiology* 98(3): 637-640, 1971.

2945 RADIODIAGNOSIS OF CECUM TUMORS. (Pol.) Lazecki, L. (Med. Acad. Inst. Roentgenol. Diagn., Warsaw, Poland). *Pol. Przegl. Radiol.* 34(5):677-688, 1970.

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2947 EXPERIMENTAL LYMPHOGRAPHY AND INTRAVENOUS HEPATOGRAPHY WITH CONTRAST OIL EMULSION STABILIZED BY CHOLATE DETERGENTS. (Hun.) Szenest, T. (Med. U., Szeged, Hungary) and G. Thury. *Magy. Radiol.* 23(1):6-10, 1971.

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2990 HEPATOGRAPHY AND SPLENOGRAPHY WITH LIPIODOL ULTRAFLUID. (Sp.) Arevalo Jimenez, E. (Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(6):671-674, 1971.

See also numbers: 2771, 2918, 3047, 3197, 3226, 3327, 3344, 3352

GASTROINTESTINAL DISEASES

ESOPHAGUS

2991 PERFORATION OF THE ESOPHAGUS: AN ANALYSIS OF TWENTY-NINE CASES. (E.) Middleton, C. J. (Hartford Hosp., Conn.). *Hartford Hosp. Bull.* 26(1):36-43, 1971.

Among 16 patient deaths there were 7 iatrogenic (instrumentation or surgery) and 9 spontaneous perforations of the esophagus. Of these 16 perforations, 15 were located in the thoracic esophagus. Primary surgical treatment was associated with less mortality than primary nonsurgical treatment. Four factors should be considered in treating esophageal perforation: the cause of the perforation, the presence or absence of underlying organic esophageal disease, the size and site of the perforation and, the time interval between perforation and diagnosis. Perforation of the thoracic esophagus is generally followed by more morbidity and mortality than is perforation of the cervical esophagus (usually secondary to instrumentation). Surgical treatment is generally treatment of choice for perforation of the thoracic esophagus, but nonoperative therapy (antibiotics, drainage) may be performed initially in the patient with an instrumental tear in the absence of underlying organic disease and with early diagnosis. Spontaneous perforation of the esophagus, usually a tear in the posteriolateral wall of a basically normal esophagus near the stomach, was always large and deadly.

2992 DOES HIATUS HERNIA AFFECT COMPETENCE OF THE GASTROESOPHAGEAL SPHINCTER? (E.) Cohen, S. and L. D. Harris (Univ. Hosp., Boston, Mass.). *N. Engl. J. Med.* 284(19):1053-1056, 1971.

Subjects consisted of 25 patients without hiatal hernia and without esophageal reflux, 25 patients with sliding hiatal hernia but without esophageal reflux and 25 with symptoms of serve gastroesophageal reflux, of whom 12 had hiatal hernia and 13 did not. Esophageal manometry was performed after assignment of patients to 1 of the 3 groups. At the time of manometric studies, fluoroscopy showed the lower esophageal sphincter to be at least 3 cm above the shadow of the diaphragm in all patients with hiatal hernia and below the diaphragm in all patients without hiatal hernia. The mean lower esophageal sphincter pressure was 20.4 mm Hg in those with reflux or hernia, 19.6 mm Hg in those with hernia but without reflux, while those with reflux had mean levels of 3.8 mm Hg with and 1.3 mm Hg without hiatal hernia. When intra-abdominal pressure was increased by external compression, the increase in lower esophageal pressure always exceeded the increase in gastric pressure in those without symptoms of reflux, while the opposite was obtained in those with symptomatic reflux.

2993 THE NATURAL HISTORY OF SQUAMOUS VERRUCOSE CARCINOMA OF THE ESOPHAGUS. (E.) Meyerowitz, B. R. (San Mateo County Gen. Hosp., Calif.) and L. T. Shea. *J. Thorac. Cardiovasc. Surg.* 61(4):646-649, 1971.

A single case is reported of a 45-year-old Negro male in whom the lesion had been present for 7 yr before diagnosis. Definitive therapy consisted of bringing the stomach up to the esophagus above the aortic arch to facilitate esophagogastrectomy and pyloroplasty. The patient was discharged with an adequate anastomosis and good function of the intrathoracic stomach. The literature is reviewed (3 references).

2994 TREATMENT OF ACHALASIA WITH PNEUMATIC DILATATIONS. (E.) Vantrappen, G. (St. Raphael Acad. Hosp., Louvain, Belgium), J. Hellemans, W. Deloof, P. Valembois and J. Vandenbroucke. *Gut* 12(4):268-278, 1971.

Forceful dilations (pneumatic) and the Keller operation are the 2 methods most frequently used for the relief of functional obstruction at the cardia. All but 6 of 264 patients were treated by 1 single technique of consecutive pneumatic dilations over a period of 13 yr. Evaluation by an unbiased observer was based on personal interview, radiological examination and manometry (esophageal lumen). Follow-up data was available for 133 patients, of whom 77% were found to be completely or almost completely free of symptoms. Best results were obtained in patients who have had symptoms for a period of about 5-20 yr and have a moderately dilated esophagus with a diameter of 50-80 mm. Perhaps esophageal diameter is an important factor in determining the result of pneumatic dilatations. The aim of treatment of achalasia by pneumatic dilations should be the abolition of the high pressure zone in the lower esophagus. Gastro-esophageal reflux and peptic esophagitis seem to be more of a problem after Heller's operation than after forceful dilatations, the low incidence following pneumatic dilation probably being due to the extreme difficulty in disrupting the oblique fibers of the stomach with a dilator.

2995 CARCINOMA OF THE ESOPHAGUS. A DISASTER (E.) Leon, W. (3600 Prytania St., New Orleans, La.), L. H. Strug and I. D. Brickman. *Ann. Thorac. Surg.* 11(6):583-592, 1971

The present study of 548 patients with epidermoid carcinoma of the esophagus indicated a very low 5-year survival rate (1.6%). The patients, being from low socioeconomic groups, sought medical aid late and also the fact that definitiv surgical therapy was not suggested at an early stage contribute to the observed high mortality. The disease is of such a nature that early symptoms do not occur, and the patient when first seen is often already in a far-advanced stage of disease due to direct local invasion of vital mediastinal structures and lymph node metastases. The poor condition of the patients comprising this series, (particularly their protein depletion) rendered them highly susceptible to catastrophic complications. Esophagogastrectomy is advocated as a palliative procedure for those patients in whom local invasion or lymph node metastasis precludes cure. When cure is possible a right thoracotomy with total esophageal resection and right sided cervical esophagostomy and gastrostomy is performed. Substernal colon transplantation at a later date may be better than immediate transplantation.

2996 SURGICAL TREATMENT OF GASTROESOPHAGEAL REFLUX IN INFANTS AND CHILDREN: LONG-TERM RESULTS IN 28 CASES. (E.) Vos, A. (U. Amsterdam Wilhelmina Hosp., Netherlands) and I. Boerema. *J. Pediatr. Surg.* 6(2, Pt. 1):101-111, 1971.

A group of 28 infants and children with radiologically diagnosed esophageal hiatus hernia were treated surgically for gastroesophageal reflux. Outstanding symptoms included: vomiting, anemia, undernourishment, and respiratory tract infections. The operation of choice was rightsided subhepatic anterior gastropexy; a more extensive operation (resection of an esophageal stricture with subsequent esophagogastrostomy) was required in only 1 patient. Follow up studies revealed no operative mortality. Most (96%) of the patients were completely relieved of complaints directly following operation. The purpose of right-sided subhepatic anterior gastropexy is reduction of the gastroesophageal junction several centimeters below the diaphragm and creation of an almost exaggerated sharp angle of His, which is believed to be essential for the prevention of reflux. The validity of this theory was supported by postoperative radiography.

2997 INVAGINATION FOR CONTROL OF REFLUX AFTER ESOPHAGOGASTRIC ANASTOMOSIS. (E.) Henderson, R. D. (U. Toronto Dept. Surg., Ontario, Canada), J. F. Lind and B. Feaver. *Can. J. Surg.* 14(3):195-201, 1971.

After baseline studies of esophageal motility, esophagoscopy and barium swallow, mongrel dogs were subjected to esophagogastrectomy. Three types of esophagogastric anastomosis were constructed: end-to-end alone; end-to-end followed by invagination of the esophagus into the stomach for a distance of 2-4 cm; end-to-end with invagination of the esophagus into the stomach for a distance of 4-5.5 cm. Motility studies showed that dogs without invaginations had no effective pressure barrier to reflux between the esophagus and the stomach, while results in those with invaginations less than 4 cm were variable, compared with those with 4-5.5 cm invaginations who showed a good pressure barrier (which was completely maintained during abdominal pressure). Radiographic studies showed free reflux up to the pharyngoesophageal junction in all dogs lacking invagination, less reflux in those with 2-4 cm invaginations and no reflux in those with longer invaginations, despite the use of the Trendelenburg position and abdominal compression. At sacrifice, dogs without invagination showed marked reflux esophagitis, and this was less so in those with 2-4 cm invaginations and virtually nonexistent in those with 4-5.5 cm invaginations.

2998 PALLIATIVE TREATMENT OF OBSTRUCTING NEOPLASMA OF THE OESOPHAGUS AND CARDIA BY PERMANENT INTUBATION. (E.) Bertelsen, S. (Natl. Hosp., Copenhagen, Denmark). *Acta Chir. Scand.* 137(2):165-168, 1971.

A group of 54 patients with inoperable stenosing malignant tumors of the esophagus or cardia were treated by permanent intubation with either Souttar's tube (pushed down during esophagoscopy) or Mousseau-Barbin tubes (pulled down through a gastrotomy). Palliative results were good in all patients. They could drink, and those with the Mousseau-Barbin tube could swallow finely chewed food provided that fluids were taken simultaneously. The Souttar tube diameter was too small for solid food feeding. Complications during the use of permanent intubation included: perforation, infection, failure of tube fixation, tube blockage and reflux of gastric content. Patients with clinical evidence of local or distant metastases are best intubated with a Souttar tube. When tumors are judged to be technically inoperable on exploration, a Mousseau-Barbin tube should be preferred.

2999 A REPORT ON THREE CASES WITH CARCINOMA DEVELOPING AFTER ANTETHORACIC RECONSTRUCTIVE SURGERY OF THE ESOPHAGUS (BY SKIN GRAFT). (E.) Nakayama, K. (Tokyo Women's Med. Coll.), C. Yazawa, N. Sakakibara, H. Suzuki, M. Yano and H. Ide. *Surgery* 69(5):800-804, 1971.

Three cases in which carcinoma developed after antethoracic reconstructive surgery of the esophagus are reported. In 2 of the patients, cancer developed from the skin tube after a reconstructive operation for benign esophageal lesions after 34 and 25 yr. In these cases, the cancers were unrelated to the anastomosis itself but rather to the skin bearing the persistent fistula. The third patient died of carcinoma which developed from the reconstructed esophageal wall. In this case, the carcinoma developed in the residual lower stump of the esophagus, the interval being 14 yr.

3000 SURGICAL TREATMENT OF STRICTURES OF THE ESOPHAGUS IN PATIENTS WITH SCLERODERMA. (E.) McLaughlin, J. S. (U. Maryland Sch. Med., Baltimore), R. Roig and M. F. A. Woodruff.

J. Thorac. Cardiovasc. Surg. 61(4):641-645, 1971.

Esophageal involvement in scleroderma is common. Pathologically, there is a patchy deposition of acellular collagenous fibrous tissue in the submucosa and muscular layers and progressive smooth muscle atrophy. These lesions produce hypoperistalsis and incompetence of the cardia, the latter often in association with hiatus hernia. Normal food propulsion is retarded, and gastric reflux is permitted. Progressive distal esophagitis, initially with functional dysphagia and eventually with organic obstruction, results. Surgical therapy of esophageal disorders in scleroderma may be divided into measures directed toward prevention of stasis and reflux as well as the treatment of strictures. If conservative treatment (esophageal dilation) is unsuccessful, resection of the stricture and reconstitution of esophagogastric continuity is indicated.

3001 SURGICAL PROCEDURE TO PREVENT GASTROESOPHAGEAL REFLUX. (E.) Hidalgo, F. (IMSS Nat. Med. Ctr., Mexico City), A. Rivera A., and J. Portilla A. *Am. J. Surg.* 121(5):548-551, 1971.

A surgical method for the prevention of gastroesophageal reflux, involving the building of a triangular gastric fold sutured to the anterior and lateral esophageal aspects thus providing a valve action, was described. Of 11 dogs with esophagogastric anastomosis performed by this procedure, only 1 showed reflux; minimal esophagitis was seen in 2. In 5 animals with direct anastomosis between esophagus and stomach, reflux was observed roentgenologically and endoscopically. Two factors favor the valve mechanism: the oblique position in which the esophagus is anastomosed to the stomach and occlusion of the esophageal lumen that results when the flaccid triangular segment of the joined mucosa moves against the esophageal wall by the mechanical pressure occurring when the gastric stump, as a fundus, distends itself. Two patients in whom this procedure produced immediate satisfactory results are presented.

3002 COLO-ESOPHAGOPLASTY TO RE-ESTABLISH CONTINUITY OF THE ALIMENTARY TRACT. (E.) Raia, A. (U. Sao Paulo Med. Sch., Brazil), P. Mattos Baretto and J. J. Gama Rodrigues. *Chir. Gastroenterol.* 5(1):22-37, 1971.

Coloesophagoplasty using the transverse colon placed in an isoperistaltic direction and performed in 2 stages was the method of choice for 13 patients with cancer of the esophagus and 72 patients with traumatic esophageal stenosis (70 of which were caustic stenosis). The rate of mortality in the cancer patients (4/13) was high and mainly due to dehiscence of the coloesophageal suture. The most frequent complication seen in patients with caustic stenosis was also partial dehiscence of the coloesophageal anastomosis. Mortality was 5.5% in patients with caustic stenosis. Partial dehiscence, either major or minor is not a risk to the patients' life when the colon is sutured in the anterior mediastinum. Coloesophagoplasty is suggested for patients with cancer of the upper third and at the junction between the middle and upper third of the esophagus and in patients with caustic stenosis which requires too prolonged progressive dilatation of the esophagus.

3003 HIATAL HERNIA AND ESOPHAGITIS: A SURVEY OF INDICATIONS FOR OPERATION AND TECHNIC AND RESULTS OF FUNDOPLICATION. (E.) Polk, H. C., Jr. (U. Miami Sch. Med., Fla.) and R. Zeppa. *Ann. Surg.* 173(5):775-781, 1971.

An international survey of the efficacy of fundoplication for the treatment of hiatal hernia with emphasis on long-term follow-up is presented. Ninety six percent of the patients surviving fundoplication were free of esophagitis and its complications through follow-up evaluations averaging 2.5 yr postoperatively. The overall mortality associated with fundoplication was 0.8% (14 of 1814). Overall morbidity was approximately 13%, with dysphagia occurring in 5% of the patients who underwent this procedure. Although this survey provides convincing proof that this operative procedure is an effective method for controlling reflux, the median follow-up was still under 3 yr.

3004 GASTRIC LINED ESOPHAGUS ASSOCIATED WITH RINGS AND STENOSES. (E.) Johnston, J. H., Jr. (U. Mississippi Sch. Med., Jackson). *Ann. Surg.* 173(5):641-648, 1971.

Thirty one patients with lower esophageal rings were studied at the time of operation. Gastric lined esophagus associated with rings and stenoses was observed in 23 of the 31 cases. Twenty four of the 31 patients had a history of previous reflux esophagitis (77%) while 11 (35%) had an active ulcer or a history of peptic ulceration. Of the observed rings, 18 were located at or within 2.5 cm of the true esophagogastric junction; however, 13 of the 31 rings, while found at the squamo-columnar mucosal junction, were located well within the esophagus 3 to 7 cm above the true esophagogastric junction. Parietal and zymogenic cells were found in the glandular epithelium lining the distal esophagus in 4 of the 13 cases (31%). All stages of annular peptic stenosis from squamous esophageal rings to fibrotic stenosis were observed. The typical symptoms of gastric lined esophagus was reflux esophagitis with minimal dysphagia and an area of narrowing in the mid or lower esophagus associated with patulous cardia allowing ready reflux from the stomach.

3005 COMPARISON OF CRURAL REPAIR AND NISSEN FUNDOPLICATION IN THE TREATMENT OF ESOPHAGEAL HIATUS HERNIA WITH PEPTIC ESOPHAGITIS. (E.) Woodward, E. R. (U. Florida Coll. Med., Gainesville), H. F. Thomas and J. C. McAlhany. *Ann. Surg.* 173(5):782-792, 1971.

The results of various surgical methods for the treatment of sliding esophageal hiatus hernias and peptic esophagitis were evaluated in 231 patients. Of 127 patients treated by crural repair, with and without vagotomy and pyloroplasty, clinical recurrence of esophagitis was observed in 18%, anatomic recurrence of hiatal hernia (radiologically determined) was seen in 39%, and esophageal reflux (determined by pH measurement) occurred in 55%. The addition of vagotomy and pyloroplasty had no significant effect. Of 104 patients who were treated by Nissen fundoplication, 8% showed clinical recurrence of esophagitis, 5% exhibited x-ray recurrence of hiatal hernia, and 46% had esophageal reflux. A favorable prognosis was associated with a negative postoperative pH measurement of gastroesophageal reflux in all patients. Vagotomy and pyloroplasty seemingly do not improve the clinical result of either procedure and do not prevent recurrent esophagitis symptoms in patients who develop anatomic recurrence.

3006 SURGICAL TREATMENT OF STRICTURE OF THE ESOPHAGUS ASSOCIATED WITH HIATAL HERNIA. (E.) Brindley, G. V., Jr. (Scott and White Clin., Temple, Tex.) and L. Wangsanutr. *Ann. Surg.* 173(5):649-656, 1971.

The results of 554 patients who underwent herniorrhaphy for stricture of the esophagus associated with hiatal hernia at the Scott and White Memorial Hospital are reviewed. Definitive treatment for reflux stricture was necessary in 38 cases while marked esophagitis without stricture was present in 141 patients. In 26 patients, the esophagus containing the fibrous stricture could be mobilized sufficiently to permit return of the esophagogastric junction to its normal position below the diaphragm and fixation to the preaortic fascia. Good results followed repair of the hernia and dilatation of the esophagus (1 patient died of pulmonary embolism and there was no dysphagia or esophagitis reported). When a firm, fibrous stricture with marked shortening of the esophagus was found, the diseased tissue was resected and replaced with a jejunal or colonic graft or an achlorhydric-fashioned gastric tube. The results of surgical treatment of stricture of the esophagus associated with hiatal hernia can seemingly be improved by the careful selection of operative procedure, and taking into account the individual situation of the patient.

3007 COLON INTERPOSITION IN PEDIATRIC PATIENTS WITH ESOPHAGEAL VARICES. (E.) Lynn, H. B. (Mayo Clin., Rochester, Minn.). *Ann. Surg.* 173(5):706-713, 1971.

Colon replacement of the esophagus was performed in 8 children with esophageal varices. In none of these patients were the vagus trunks sacrificed nor pyloroplasty performed, however, gastrostomy was followed by slowly increased feedings in all cases. Of the 8 patients, none has died after varying periods of years, and only 1 has had a serious complication which was a leak of the upper anastomosis which was corrected. After this problem was detected, a nasoesophago-colonic suction tube was employed and left in place at least 72 hr or until there was no further distention or respiratory problem in all cases. The colon seemingly can be employed satisfactorily in children to replace or bridge the esophagus.

3008 PALLIATIVE OPERATION FOR CARCINOMA OF CERVICAL AND THORACIC ESOPHAGUS. (E.) Burdette, W. J. (U. Texas M. D. Anderson Hosp., Houston). *Ann. Surg.* 173(5):714-732, 1971.

The results of 28 patients with carcinoma of the esophagus operated upon during a 4 yr period are presented. Review of social habits of the group revealed the usual prevalence of smoking and drinking of alcoholic beverages (27 smoked and 14 drank heavily). The diagnosis was made by esophagram and esophagoscopy. Five deaths occurred in the postoperative period, a mortality rate of 16%. The terminal ileum and right colon were successfully used to bypass both thoracic and cervical esophageal carcinoma in most cases. All of the patients with a satisfactory response were able to swallow up to the time of death. No postoperative deaths occurred in patients having second-stage thoracic esophagotomies. A 2-yr survival rate of 25% seems to be a reasonable expectation when a primary ileocolic interposition operation is followed by a second-stage esophagectomy only in patients with more favorable lesions. The prognosis for cure appeared better for cervical than thoracic esophageal cancer.

3009 ESOPHAGEAL REFLUX. (E.) Carr, D. (U. Tennessee Coll. Med., Memphis). *Ann. Surg.* 173(5):767-774, 1971.

The effects of esophageal reflux and the known factors contributing to incompetence of the lower esophageal sphincter as a valve mechanism were examined, in order to outline rational measures for its prevention. Esophagitis, stricture, and ulceration of the lower esophagus, hematemesis and perforation, and carcinoma of the esophagus were among the esophageal complications of reflux. Bronchopulmonary problems associated with reflux included recurring pneumonitis, chronic bronchitis, bronchiectasis, hemoptysis, asthma, emphysema, and alveolar capillary block. Esophageal reflux can be alleviated by following a rigid medical regimen or by surgical intervention.

Fundal plication operations appeared to offer the best physiological approach to restoring the competency of the gastroesophageal valve in complicated as well as uncomplicated cases.

3010 PRIMARY NEVO-CARCINOMA OF THE ESOPHAGUS. (Fr.) Coste, T. (Beaujon Hosp., Clichy, France), O. Groussart, J. Vallin and R. Dupuy. *Arch. Fr. Mal. App. Dig.* 60(3):131-138, 1970.

3011 UNDIAGNOSED TRAUMATIC DIAPHRAGMATIC HERNIA. (E.) Samaan, H. A. (Roy. Infirm., Edinburgh, Scotland). *Br. J. Surg.* 58(4):257-261, 1971.

3012 FORMS OF THE VAGUS TRUNK AND THEIR DISTRIBUTION IN THE ESOPHAGEAL HIATUS IN MAN. (Pol.) Kurylcio, L. (Med. Acad. Inst. Human Anat., Lublin, Poland). *Folia Morphol. (Warsz.)* 30(1):79-91, 1971.

3013 HIATUS HERNIA ASSOCIATED WITH ACHALASIA OF THE ESOPHAGUS. (E.) Palmer, E. D. (Coll. Med. New Jersey, Newark). *Gastrointest. Endosc.* 17(4):177-178, 1971.

3014 USES OF ESOPHAGEAL MANOMETRY AND ACID PERFUSION IN THE STUDY OF GASTROESOPHAGEAL REFLUX AND HIATAL HERNIA. (E.) Garabedian, M. *Surg. Clin. North Am.* 51(3): 589-596, 1971.

3015 GASTROESOPHAGEAL REFLUX. INDICATIONS FOR FUNDOPLICATION. (E.) Ellis, F. H., Jr. *Surg. Clin. North Am.* 51(3):575-588, 1971.

3016 SOME PRINCIPLES IN TREATING PERFORATION OF THE ESOPHAGUS. (E.) Boyd, D. P. and C. J. Whittmann, Jr. *Surg. Clin. North Am.* 51(3):567-574, 1971.

3017 TRANSABDOMINAL REPAIR OF HIATAL HERNIA. (E.) Boyd, D. P. *Surg. Clin. North Am.* 51(3):597-606, 1971.

3018 GASTROESOPHAGEAL REFLUX. CLINICO-RADIOLOGIC EVALUATION OF THE SYNDROME IN ITS DIVERSE ASPECTS. (It.) Ricceri, R. (U. Rome Inst. Gen. Clin. Surg., Italy), M. Maurizi Enrici and G. Spallone. *Riv. Chir. Pediatr.* 12(4):475-482, 1970.

3019 ESOPHAGEAL DIVERTICULA. (Pol.) Slowikowski, J. (Med. Acad. Pediatr. Surg. Clin., Wroclaw, Poland) and J. Wojtowicz. *Wiad. Lek.* 23(21):1905-1908, 1970.

3020 ACHALASIA AND CARCINOMA OF THE ESOPHAGUS. (E.) Wychulis, A. R. (U. Minnesota Mayo Grad. Sch. Med., Rochester), G. L. Woolam, H. A. Andersen and F. H. Ellis, Jr. *JAMA* 215(10):1638-1641, 1971.

3021 RADIOTHERAPY OF CANCER OF THE ESOPHAGUS (237 INOPERABLE CASES). (E.) Robillard, J. (Francois Baclesse Ctr., Caen, France), Y. Couedic, J. E. Couette and J. S. Abbatucci. *J. Radiol. Electrol. Med. Nucl.* 51(12):785-789, 1970.

3022 HIATAL HERNIA AND 'RUMINATION' IN INFANTS AND CHILDREN. (E.) Herbst, J. (Univ. Sch. Med., Stanford, Calif.), G. W. Friedland and F. F. Zboralske. *J. Pediatr.* 78(2):261-265, 1971.

3023 MISDIAGNOSIS OF ESOPHAGEAL PERFORATION BY A FOREIGN BODY AS INFLUENZA. (Pol.) Tomaszewska, Z. (Med. Acad. Dept. Forensic Med., Lublin, Poland) and A. Iwaszkiewicz. *Arch. Med. Sadowej Krym.* 20(1):107-109, 1970.

3024 SPASTIC DISORDER OF MOTILITY OF THE GASTROESOPHAGEAL SPHINCTER. (Ger.) Lorentz, F. W. (Leipzig Hosp., Germany). *Dtsch. Gesundheitsw.* 25(46):2193-2197, 1970.

3025 THE BEHAVIOR OF THE SPHINCTERAL SEGMENT OF THE ESOPHAGUS IN CASE OF NEONATAL HIATAL HERNIA. (Ger.) Holthusen, W. (Rothenburgsort Pediatr. Hosp., Hamburg, Germany). *Fortschr. Geb. Rontgenstr. Nuklearmed.* 113(6): 746-753, 1970.

3026 ANATOMICAL STUDY OF 'ABDOMINAL MESO ESOPHAGUS'. SURGICAL DEDUCTIONS. (Fr.) Boutelier, P. (Bichat Hosp., Paris) and R. Lefort. *J. Chir. (Paris)* 100(5):371-384, 1970.

3027 ANTERIOR DIAPHRAGMATIC HERNIAS IN THE ADULT. A REPORT ON 8 CASES. (Fr.) Plane, P. (CHU Surg. Clin. B, Angers, France) and J. Ronceray. *J. Chir. (Paris)* 100(5): 387-398, 1970.

3028 A CASE OF LIPOMA OF THE ESOPHAGUS. (Fr.) Chapuis, Y. (Cochin Hosp., Paris) and P. Clot. *J. Chir. (Paris)* 100(4): 291-294, 1970.

3029 ESOPHAGOPLASTY IN CICATRICIAL OBSTRUCTI (Rus.) Shalimov, A. A. and A. G. Vinnichenko. *Khirurgiia (Mosk.)* 46(12):28-31, 1970.

3030 HIATUS HERNIA. (Ser.) Glisic, L. (Univ. Med. Fac., Belgrade, Yugoslavia), S. Rodic and Z. Brndusic. *Med. Glas.* 24(3): 121-123, 1970.

3031 SHOULD HIATUS HERNIAS BE OPERATED ON? (Fr.) Fekete, F. (Beaujon Hosp., Paris) and J. Thiroloix. *Medica (Paris)* 89:35-45, 1970.

3032 MEGAESOPHAGUS. BRIEF RADIOLOGICAL NOTE. (Sp.) Bada, J. L. (Catholic Hosp., Monrovia, Liberia). *Rev. Clin. Esp.* 119(3): 269-270, 1970.

3033 INOPERABLE CANCER OF THE ESOPHAGUS. RESULTS OF CONVENTIONAL DEEP ROENTGEN THERAPY AND TELEGAMMATHERAPY. (Ger.) Becker, G. (City Hosp., Dortmund, Germany) and C. W. Fassbender. *Strahlentherapie* 140(4):354-361, 1970.

3034 PATHOMORPHOLOGIC AND HISTOCHEMICAL CHANGES IN EXPERIMENTAL CHEMICAL BURNS OF THE ESOPHAGUS. (Rus.) Avakian, S. M., A. G. Alaverdian and D. S. Suknasian. *Vestn. Otorinolaringol.* 32(5):119, 1970.

3035 ESOPHAGEAL DUPLICATION. (Pol.) Kowalski, R. (Med. Acad 1st Pediatr. Clin., Wroclaw, Poland), A. Soltys and J. Zajac. *Wiad. Lek.* 23(21):1909-1913, 1970.

3036 A STUDY OF THE CAUSES OF FAILURE OF ESOPHAGOCARDIOMYOTOMY FOR ACHALASIA. (E.) Nemir, P., Jr. (U. Pennsylvania, Sch. Med., Philadelphia), M. Fallahnejad and B. Bose. *Am. J. Surg.* 121(2):143-149, 1971.

3037 PILOT EXPERIENCE WITH THE 'BOEREMA BUTTON' IN EMERGENCY MANAGEMENT OF BLEEDING ESOPHAGEAL VARICES. (E.) Burns, G. P. (Edward J. Meyer Mem. Hosp., Buffalo, N. Y.) and W. G. Schenk, Jr. *Am. J. Surg.* 121(2):115-118, 1971.

3038 NEUROSECRETORY VESICULAR COMPONENT OF MEGAESOPHAGUS IN BRAZILIAN TRYPANOSOMIASIS. (Por.) Tafuri, W. L. (Fed. U. Sch. Med. Minas Gerais, Belo Horizonte, Brazil) and T. De Almeida Maria. *Rev. Inst. Med. Trop. Sao Paulo* 12(5):298-309, 1970.

3039 CANDIDIASIS OF THE OESOPHAGUS. (E.) Guyer, P. B. (Southampton Gen. Hosp., England), F. J. Brunton and H. W. P. Rooke. *Br. J. Radiol.* 44(518):131-136, 1971.

3040 BARRETT-TYPE ESOPHAGUS ASSOCIATED WITH SQUAMOUS CARCINOMA. (E.) Tamura, H. (Miriam Hosp., Providence, R. I.) and S. A. Schulman. *Chest* 59(3):330-333, 1971.

3041 PERFORATION OF THE ESOPHAGUS. (Pol.) Montowski, J. (1st Gen. Hosp., Bydgoszcz, Poland). *Pol. Przegl. Chir.* 42(9): 1306-1309, 1970.

3042 THE SURGICAL TREATMENT OF COMPLICATIONS IN SLIDING HERNIA OF THE ESOPHAGEAL HIATUS. (Cz.) Rapant, V. (Palacky U 1st. Surg. Clin. Olomouc, Czechoslovakia). *Rozhl. Chir.* 49(9):477-482, 1970.

3043 SURGICAL TREATMENT OF MEGAESOPHAGUS. (Sp.) Zavaleta, D. E. *Prensa Med. Argent.* 57(26):1283-1287, 1970.

3044 DIFFERENTIAL DIAGNOSIS OF REFLUX ESOPHAGITIS: CICATRICIAL STRICTURE AND RECURRENCE OF CANCER FOLLOWING GASTRECTOMY AND PROXIMAL RESECTION. (Rus.) Plotnikov, V. I. and V. P. Letiagin. *Sov. Med.* 33(9):71-76, 1970.

See also numbers: 2701, 2772, 2914, 2977, 3116, 3480

3045 GASTRIC ULCER AND THE ANTI-ARTHRITIC DRUGS. (E.) Emmanuel, J. H. (King's Coll. Hosp., London) and R. D. Montgomery. *Postgrad. Med. J.* 47(546):227-232, 1971.

Experiences with 16 arthritic patients suffering from gastric ulcer were reported. Most of these patients were receiving indomethacin and/or steroid drugs. Gastric ulcers, located usually on the posterior wall and greater curvature of the antrum, healed rapidly when indomethacin administration was discontinued and steroids were continued. All of the patients with gastric hemorrhage were taking salicylates at the time. The increased incidence of peptic ulcer in patients receiving anti-arthritic drugs is seemingly confined to gastric ulcer and there may be an increased susceptibility to antral ulcer in severe rheumatoid disease, which may largely account for the steroid ulcer. The combined use of indomethacin, a potentially ulcerogenic drug, with steroids is contraindicated. Hence the 2 drugs in this study apparently acted synergistically. The role of aspirin (except for its propensity for producing hemorrhagic erosions) in the etiology of chronic ulcer remains doubtful.

3046 SERUM GASTRIN IN CHRONIC GASTRITIS. (E.) Korman, M. G. (Monash U. Dept. Med., Melbourne, Australia), R. G. Strickland and J. Hansky. *Br. Med. J.* 2(5752):16-18, 1971.

Fasting serum gastrin levels were measured in a group of 49 patients with various types of chronic gastritis and in matched controls. The mean level of serum gastrin was markedly elevated in patients with pernicious anemia and this hypergastrinemia was independent of the presence of antibody to intrinsic factor. In addition, gastrin levels were raised in patients with atrophic gastritis who were seropositive for parietal cell antibody but who had adequate vitamin-B_{12} absorption. In single atrophic gastritis and multifocal gastritis, both types of patients being seronegative for parietal cell antibody, gastrin levels were comparable to control levels. Apparently, neither achlorhydria nor the in vivo action of the parietal cell antibody wholly accounts for hypergastrinemia. Serum gastrin levels may prove useful in patients with gastritis and total achlorhydria as a further marker of the type of gastritis (simple, diffuse or multifocal) which determines the eventual development of the gastric lesion of pernicious anemia.

3047 MODIFIED TETRACYCLINE FLUORESCENCE TEST FOR GASTRIC CANCER: PRELIMINARY RESULTS. (E.) Berk, J. E. (U. California Coll. Med., Irvine), K. H. Ibsen and C. Blau. *Scand. J. Gastroenterol.* 6(2):169-171, 1971.

A group of 73 adult subjects were tested for gastric cancer using the tetracycline fluorescent test with certain chromatographic modifications, and the results wrre compared with histological and clinical diagnoses. Tetracycline was not found by paper chromatography in the gastric sediments of any of the 62 nongastric cancer subjects while a positive qualitiative test for tetracycline was obtained in 10 (91%) of the 11 patients with gastric cancer. Quantitative assay of tetracycline in the gastric sediment also showed distinct differences between the control and the gastric cancer groups. The same clear distinction between the 2 groups prevailed, regardless of whether tetracycline was given over a 5-day or a 2.5-day period.

3048 SUSCEPTIBILITY OF EXPERIMENTAL ATROPHIC GASTRITIS TO ULCERATION. (E.) Ritchie, W. P., Jr., and J. P. Delaney (U. Minnesota Dept. Surg., Minneapolis). *Gastroenter* 60(4):554-559, 1971.

Following experimentally-induced atrophic gastritis (implantation of a wedge of gastric corpus into the anterior abdominal wall with the development of atrophic gastritis within 6-8 weeks followed by reimplantation back to the stomach) one group of dogs were subjected to 14 daily s.c. injections of 30 mg histamine in beeswax. In a second group with atrophic explants, reimplantation was followed only by exposure to normal endogenous acid secretion. For this second group the mucosa retained its gastritic appearance with no evidence of ulceration at the time of sacrifice (19-21 days after reimplantatio There was parietal and chief cell regeneration in the bases of the glands. However, in the 10 dogs in which gastritic atrophic wedges were exposed to continuous histamine-induced hypersecretion of gastric acid, 8 developed full thickness ulcerations confined to the atrophic mucosa. Comparison of mucosal blood flow between histologically normal reimplanted mucosa and histologically atrophic mucosa during histamine stimulation revealed no significant differences. The ulcerogenic potential of this preparation appears to be associated with mucosal morphologic and functional changes in atrophic gastritis.

3049 HYPERPLASIA OF THE GASTRIC MUCOSA DURING PREGNANCY AND LACTATION IN THE RAT. (E.) Crean, G. P. (Med. Res. Council., Edinburgh, Scotland) and R. D. E. Rumsey. *J. Physiol. (Lond.)* 215(1):181-197, 1971.

The effect of pregnancy and lactation on the growth of the gastric mucosa was studied in rats sacrificed at weekly intervals after impregnatio Hyperplasia of the gastric mucosa occurred during pregnancy and lactation, and was haracterized by dimensional changes as well as y increases in the actual mass of the secretory ells. Increases in the surface area of the fundus and in the thickness of the fundic mucosa s well as in the volume (mass) of the gastric ucosa and the total parietal and peptic cell opulations were observed. These effects eveloped very shortly after conception, and were tatistically significant after the second week f pregnancy. Hyperplasia continued to develop ntil the early stages of lactation, but thereafter hyperplasia decreased. The observed yperplasia did not seem to be due to hyperphagia r to the increase that occurred in body weight uring pregnancy.

050 THE ROLE OF BLOOD SUGAR LEVEL IN THE PRODUCTION OF EXPERIMENTAL GASTRIC LCERS IN THE ALBINO RAT BY PYLORIC LIGATION. (E.) Ganguly, A. K. (Jawaharlal Inst. Postgrad. ed. Ed. Res., Pondicherry, India) and S. K. Lal. *ndian J. Physiol. Pharmacol.* 14(3):121-124, 1970.

yloric ligation alone led to the development of lcers in 83% of the albino rats studied. Ligation nd insulin-induced hypoglycemia were associated ith a 100% incidence of ulcer formation. However, when alloxan-induced hyperglycemia was oupled with ligation, only 61.5% developed lcers, with most of these ulcers being restricted to the body of the stomach. When the volume of gastric content was less than 3 ml, ulcers did ot develop, and conversely, in rats developing lcers the volume was always greater than 3 ml. yperglycemia exerts a protective effect on the gastric mucosa by inhibiting acid secretion hile hypoglycemia promotes formation of ulcers. A relation between blood sugar levels and the secretory activity of gastric mucosa is suggested.

3051 THICK GASTRIC FOLDS IN CHILDHOOD. (E.) Lachman, R. S. (Child. Hosp. Med. Ctr., Boston, Mass.), D. J. Martin and G. F. Vawter. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):83-92, 1971.

Three cases of gastric rugal enlargement presenting with symptomatology of Menetrier's disease are presented. Two of the children had the histologic features of Menetrier's disease with 1 of them exhibiting cytomegalic inclusion bodies in the gastric wall. The other child had histology consistent with angioneurotic edema. In all 3 cases, hypoproteinemia, subsequent edema, and ascites occurred. The radiological appearance was similar to that of lymphosarcoma with gastric involvement, Peutz-Jeghers syndrome with hamartomas of the stomach, multiple adenomatous polyps of the stomach, and some forms of ulcer disease. Two of these children had a benign course and 1 died of renal disease.

3052 HISTOCHEMICAL AND HISTO-AUTORADIOGRAPHICAL CHANGES IN GASTRIC MUCOSA OF DOGS SUBMITTED TO CHRONICAL CORTISONE ADMINISTRATION. (E.) Willems, G. (Saint-Pierre Univ. Hosp., Brussels, Belgium), A. Gerard and S. Verbeustel. *Digestion* 4(2):92-102, 1971.

Gastric ulcers were induced in 5 of 18 dogs treated chronically with doses of 30-50 mg cortisone/kg body weight. Histochemical changes seen after 4 days included enlargement of the crypt cells and enlargement of cellular cups containing the mucus in the surface of the fundus. Radioactive sulfate uptake by the crypt cells in this area was increased and extended even to the surface epithelial cells, while extracellular mucus material was noted in the lumen of the glands. In opposition to that observed in the fundic mucosa, the mucous cells of antral superficial epithelium and crypts were, in many zones, partially emptied of their intracellular glycoprotein content, these zones becoming more numerous as the treatment was continued. In many areas, the lumen of the pyloric glands was distended by extracellular mucus and the radiosulfate labeling of these cells was also increased, as was the radioactivity of the extracellular material. Hyaluronidase digestion almost completely removed this labeling. Compared to control specimens, the periodic acid-Schiff reactive mucous content of superficial epithelial and crypt cells bordering all the ulcers was reduced. The radiosulfate labeling of the crypts bordering the ulcers was strikingly reduced. Chronic cortisone administration can stimulate production of sulfated glycoproteins by the fundic surface and of the chondroitin-4-sulfate-like substance by the peptic cells and pyloric glands. However, the hypothesis that this drug might exert its ulcerogenic effect by inducing a localized glandular exhaustion should still continue to be considered.

3053 GASTRODUODENAL INTUSSUSCEPTION IN A CHILD. (E.) Apfelberg, D. B., M. Glicklich (411 E. Mason St., Milwaukee, Wis.) and T. T. Tang. *Surgery* 69(5):736-740, 1971.

A case is reported of a 23-month-old female admitted with a 3-day history of abdominal pain, vomiting and irritability. An inconstant, freely movable 3 X 8 cm oblong mass was palpated in the epigastric and periumbilical areas. Serum electrolytes showed: Na^+, 160 mEq/l; K^+, 3.2 mEq/l; Cl^-, 90 mEq/l; and CO_2 content, 20.5 mEq/l. Despite i.v. hydration she continued to vomit coffee-colored fluid. At laparotomy, a gastroduodenal intussusception, with the anterior wall of the stomach invaginated into the third part of a dilated duodenum, was reuced without difficulty. The lead point consisted of a sessile polyp (6 cm diameter) of the anterior gastric wall. Surgical procedures consisted of a wedge resection of the anterior stomach wall including the polyp, gastrostomy for decompression and a feeding jejunostomy. The postoperative course was unremarkable, oral feedings were well tolerated and the child was discharged on the tenth postoperative day. Pathologically, the specimen was determined to be an adenomatous polyp.

3054 CLINICAL TRIAL OF 3-α-PHENYLPROPYL-5-β-DIETHYLAMINOETHYL-1,2,4-OXADIAZOLE AND ITS EFFECT ON GASTRIC ACIDITY. (Ger.) v. Mikulicz-Radecki, J.-G. (Univ. 1st Med. Clin., Heidelberg, Germany). *Arzneim. Forsch.* 21(1): 40-41, 1971.

Proxazole (100-400 mg p.o. every 2 hr) increased the alkali test time from a mean of 8.8 min in 6 patients with gastric hyperacidity but increased the alkali test time by only 15% in 4 patients with normal gastric acid secretion. Gastric motility was decreased in 8 of these 10 patients and 3 patients reported a decrease in appetite. Best results were obtained with 300 mg of proxazole. Proxazole was also given to 21 patients with gastritis (10), peptic ulcers (4), spastic upper abdominal disorders associated with other diseases (6), and autonomic and dystonic disorders (1). Proxazole alleviated spastic pain well or very well in 12 of these 21 outpatients; 7 patients noted improvement and 2 failed to respond. No deleterious side-effects were observed at the dosages employed.

3055 PYLOROMYOTOMY: TECHNIQUE AND USE FOR GASTRIC DRAINAGE COMBINED WITH VAGOTOMY. (E.) Marchand, P. (Johannesburg Hosp., South Africa). *Br. J. Surg.* 58(3):225-228, 1971.

Gastro-enterostomy and pyloroplasty are equally effective methods for gastric drainage which must accompany vagotomy. For high esophagogastric anastomoses, these drainage operations interfere with collateral vessels and may impede mobilization of the stomach by shortening or anchoring the gastric outlet. In this situation both internal pyloric stretching and stretch pyloromyotomy have previously provided effective gastric drainage. In 56 cases of transthoracic hiatus hernia repair, pyloric stretching with or without myotomy was used and was accompanied by vagotomy for associated duodenal ulcers. Few patients had post vagotomy diarrhea, or delayed gastric emptying. The mean reduction of gastric residue after stretch myotomy was 33%. Radiological appearances after stretch pyloromyotomy showed little deviation from normal; usually the opening was demonstrably wide and duodenal filling was rapid.

3056 EXPERIENCES WITH SURGICAL MANAGEMENT OF ACUTE GASTRIC MUCOSAL HEMORRHAGE: A UNIFIED CONCEPT IN THE PATHOPHYSIOLOGY. (E.) Drapanas, T. (Tulane U. Dept. Surg., New Orleans, La.), W. C. Woolverton, J. W. Reeder, R. L. Reed and R. F. Weichert. *Ann. Surg.* 173(5):628-640, 1971.

The records of 31 patients who underwent surgery for acute gastric mucosal hemorrhage at Charity Hospital of Louisiana were reviewed with regard to the surgical procedure used and the degree of postoperative bleeding. A high subtotal gastrectomy (67-80%) was performed in 10 patients. Five patients either rebled in the immediate postoperative period or continued bleeding, and there were 5 deaths, 3 of which were attributed to recurrent bleeding. A vagotomy and a partial gastric resection was performed in 19 patients. Only 2 of these patients rebled minimally in the postoperative period but both survived. Two deaths caused by pulmonary complications were noted. In studies with rats, it was found that vagotomy was followed by a steady decline in the number of mucosal cells containing serotonin during the first 3 postoperative days, with virtual disappearance of the cells by the fourth day. The pathogenesis of acute gastric mucosal disease seems to involve alterations in the gastric mucosal barrier, the release of vaso-active amines in the mucosa, and vascular and pathological changes.

3057 SARCOMATOUS LESIONS OF THE STOMACH. (E.) Burgess, J. N. (U. Minnesota Mayo Grad. Sch. Med., Rochester), M. B. Dockerty and W. H. ReMine. *Ann. Surg.* 173(5):758-766, 197

The incidence of various sarcomatous lesions of the stomach was studied in a group of 270 patients treated for noncarcinomatous malignancie at the Mayo Clinic from 1940 to 1965. Malignant lymphoma was present in 218 patients while 52 patients had leiomyosarcoma. Malignant lymphoma was characterized by epigastric pain, anorexia, weight loss, anemia, and achlorhydria. Manifestations of leiomyosarcoma included severe, persiste bleeding, an abdominal mass, anemia and achlorhydria. X-ray examinations indicated a carcinoma in many cases of the former group, and a benign lesion in many patients in the latter. Surgical resection was followed by radiotherapy in all cases of lymphoma. The 5- and 10-yr survival rates were 50 and 32%, resp.; however, if only those with hope of cure were considered, the rates were 64 and 44%, resp. No irradiation was given after the resection of leiomyosarcoma for which the 5- and 10-yr survival rates were 50 and 45%, resp. Those patients with hope of cure had 5- and 10-yr survival rates of 62 and 45%, resp.

3058 OBSERVATIONS ON THE HEALING OF ULCERATIONS IN EARLY GASTRIC CANCER. THE LIFE CYCLE OF THE MALIGNANT ULCER. (E.) Sakita, T. (Japan Natl. Cancer Ctr. Hosp., Tokyo), Y. Oguro, S. Takasu, H. Fukutomi, T. Miwa and M. Yoshimori. *Gastroenterology* 60(5):835-844, 1971.

The frequency of ulceration and the extent of ulcer healing in a group of 122 cases of early gastric cancer are described. Seventy-two patients showed open ulceration on the first examination. Significant healing was observed in 51 (70.8%) of these patients. No change ccurred in the remaining ulcer cases or in the 0 cases which showed malignant-appearing ulcer cars. Malignancy was documented before healing ccurred in the great majority of ulcerations in his series which showed significant healing. detailed case of complete healing of a malignant astric ulcer is also presented. A life cycle or a malignant ulcer, beginning as an ulceration n an area of mucosal cancer or as malignant egeneration of the margin of a benign ulcer, hen healing, then recurring seems to explain hese observations.

059 EFFECT OF IMMOBILIZATION AND PHENYLBUTAZONE ON JEJUNAL MUCOSA IMPLANTED N THE STOMACH OF THE RAT. (Fr.) Lambert, R. INSERM Physiopathol. Dig. Unit, Lyon, France), . André and F. Descos. *C. R. Soc. Biol. (Paris)* 64(7):1497-1500, 1970.

ections of the jejunum which had been implanted nto the stomach of Wistar rats appeared normal nd had retained their villi when they were xamined 12 months later. Of 31 rats which were mmobilized for 24 hr, 23 developed stomach ulcers. hese lesions were found primarily in the fundal ucosa (22 cases); the antrum was involved in 3, he jejunal implant in 3, and the line of sutures n 2 cases. Stomach ulcers were also found in 9 f 15 rats which had been given phenylbutazone 100 mg/kg/day i.m. for 2 days). These ulcers ere found in the fundus in 9 rats and in the ntrum in 1. The jejunal implant remained normal n all of these animals.

060 MANAGEMENT OF UPPER GASTROINTESTINAL FISTULA WITH A DOUBLE LUMEN TUBE. (E.) anski, E. V. and R. E. Weismann (Hitchcock Clin., anover, N. H.). *Am. J. Surg.* 121(4):426-429, 971.

ptimal therapy of upper gastrointestinal fistulas hould control fistula output, maintain fluid lectrolyte balance and nutrition and combat epsis. A double lumen tube (Puestoro-Olander) as inserted through a gastrostomy affording ntry into the gastrointestinal tract. The arger, decompression portion of the tube was laced at or just before the potential or actual istula and was used for suction decompression. The smaller, distal portion was placed in the jejunum beyond the ligament of Treitz for the eturn of intestinal contents and the addition f nutrition. This procedure bypasses potentially serious complications of intravenous therapy and limentation. Six patients with actual or otential upper gastrointestinal fistulas were successfully treated as nutrition and fluid and lectrolyte balance were maintained. Rapid ealing occurred and all 6 patients survived, their fistulas closing without further surgery.

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The incidence of restless legs syndrome was determined in 5 patient groups (following gastric surgery, malabsorption syndrome, diabetes mellitus, uremia, psychoneurosis) and a control group. The diagnosis was made on the basis of a questionnaire completed by each subject. The distinction between restless legs syndrome and acroparesthesia and noctural burning feet was maintained. The incidence of this syndrome, after eliminating patients with abnormal neurological signs, was 10 of 88 (11.4%) following gastric surgery, 0 of 31 (0%) with malabsorption, 7 of 49 (14.3%) with diabetes mellitus, 7 of 49 (14.3%) with uremia, 2 of 50 (4%) with psychoneurosis, and 1 of 50 (2%) of controls.

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See also numbers: 2791, 2927, 2949, 2960, 2964, 2968, 2980, 2983, 2997, 3044, 3161, 3518, 3548

PEPTIC ULCERS

3118 A COMPARATIVE INVESTIGATION OF THE EFFECTS OF SPECIFIC PSYCHOTROPIC AGENTS ON IMMOBILIZATION-INDUCED ULCER. (E.) Möllmann, H. (Westphalian Wilhelms U. Fac. Med., Munster, Germany) and H. J. Egbers. *Int. Z. Klin. Pharmakol. Ther. Toxicol.* 4(3):361-372, 1971.

Fluphenazine, pentobarbital and a mixture of the 2 each caused a steady decrease in the degree of ulceration, with the combination giving the best results in inhibiting psychogenic gastric ulcer in rats induced by intensive immobilization. The combined preparation of Chlordiazepoxide and Amitryptiline elicited no anti-ulcer activity. After immobilization a total of 808 out of 837 rats displayed ulcers (width 1 mm; length 0.5-10 mm) almost exclusively on the glandular part of the stomach. The anterior and posterior walls of the stomach were preferentially affected. Suppression of the emotions and the subsequent inhibition of ulcer formation was apparently attributable to the influence of monoamine compounds located in the CNS. The direct site of action of the psychotropic agents in exerting their effect is probably through the A-, B-, and C- receptors.

3119 OBJECTIVE ASSESSMENT OF COOPERATION WITH AN ULCER DIET: RELATION TO ANTACID INTAKE AND TO ASSIGNED PHYSICIAN. (E.) Caron, H. S. (VA Hosp., Cleveland, Ohio) and H. P. Roth. *Am. J. Med. Sci.* 261(2):61-66, 1971.

A group of 206 inpatients with peptic ulcer disease were placed on either a strict or a liberal ulcer diet; however, they were given the opportunity to cheat on their diets by obtaining a meal on the other regimen with whatever frequency they chose. Those initially placed on the strict diet adhered to this diet on 67% of the days in the study, while those on the liberal diet adhered 75% of the time. Adherence to the strict diet did not begin to fall off until the second and third week of the study. Most of the variance occurred on the part of 27% of the patients who took their assigned diets less than 60% of the time. The median patient took his assigned diet 76% of the time (75% with strict and 77% with liberal diets). In a control group of 110 patients on an unrestricted diet who were used to validate the method, the diet was recorded as taken on 95% of all observation days. The correlation between dietary cooperation and antacid intake did not differ significantly from zero for the 185 patients on whom both measures were available. Dietary adherence, but not highest antacid intake, was correlated with the physician responsible for the care of the given patient. There was no significant difference in dietary cooperation with respect to the parameters of age, race, occupational level, admission of alcohol intake, gastric and/o duodenal ulcers, previous surgery or complication during hospitalization.

3120 CHANGES IN THE POSTOPERATIVE INSULIN TEST IN RELATION TO RECURRENT DUODENAL ULCERATION. (E.) Watkin, D. F. L. (Roy. Infirm. Sheffield, England) and H. L. Duthie. *Gut* 12(4):303-310, 1971.

he acid response to insulin immediately after agotomy and several months later, was compared n patients with or without recurrent duodenal lceration. There was a marked increase in acid oncentration and output in the delayed tests in he recurrent ulcer group, while the nonrecurrence atients, as a group, showed little change over he immediate test. The above changes may be due o increased responsiveness of the parietal cells, ecovery from a transient nerve lesion (neuroraxia), or re-innervation, the latter possibly ccurring by regeneration at the site of vagal ection or by collateral nerve sprouting from a mall number of intact fibers. The delayed nsulin test may be useful as a routine check for uodenal ulcer or as part of the investigation of ecurrent symptoms.

121 INTRAGASTRIC SECRETION OF ^{131}I IN DUODENAL ULCER UNDER BASAL CONDITIONS ND FOLLOWING HISTAMINE AND INSULIN STIMULATION. E.) Szantay, I. (3rd Med. Clin., Cluj, Rumania), . Cotul, O. Fodor and S. Popescu. *Scand. J. astroenterol.* 6(2):173-176, 1971.

he effect of HCl and ^{131}I Na administration nder basal conditions and after histamine and nsulin stimulation on intragastric secretion as studied in 20 patients with duodenal ulcer nd 10 control subjects. An increased ^{131}I ecretion was found in basal conditions in duodenal lcer as compared to normal subjects. In both ontrol and duodenal ulcer patients the ^{131}I onic concentration in the gastric juice decreased ollowing insulin and histamine stimulation, as ompared to values obtained in basal conditions. nder the same circumstances, however, HCl concentration increased. Both the augmentation of he gastric juice volume and of free HCl concentration seemed to increase HCl secretion in astric juice following pharmacodynamic stimuli. he decrease of ^{131}I following stimulation was ue exclusively to the augmentation of secreted astric juice.

122 BENIGN GIANT GASTRIC ULCER. (E.) Lulu, D. J. (VA Hosp., Des Moines, Iowa). *m. Surg.* 37(6):357-362, 1971.

xperiences with 10 cases of giant (3 cm or more n diameter) benign gastric ulcers are presented. The most common symptoms were pain (100%) and leeding (90%). Diagnosis was based on radiologic xamination and the degree of accuracy was 43%. ll ulcers were located on the lesser curvature and although many extended anteriorly even more xtended posteriorly. Surgical procedures performed ranged from simple to radical gastrectomy. Although surgical treatment for control of massive bleeding may require removal of the lcer, a correct diagnosis (benign or malignant) would possibly limit the amount of resection ecessary. Penetration (to pancreas, liver, transverse mesocolon) occurred in all but 1 patient. The overall mortality rate was 10%, no deaths occurring in patients with massive bleeding. An additional group of 3 patients with carcinoma of the stomach who were believed to have gastric ulcerations were also reviewed. There was a 21% incidence of malignancy in giant gastric ulcers which again were located on the lesser curvature. The successful surgical treatment of gastric ulcers, giant or otherwise, is predicated upon removal of the gastric antrum unless hyperchlorhydria is present.

3123 LATE RADIATION NEPHRITIS AFTER GASTRIC X-IRRADIATION FOR PEPTIC ULCER. (E.) Thompson, P. L. (Roy. Melbourne Hosp., Australia), I. R. Mackay, G. S. Robson and A. J. Wall. *Q. J. Med.* 40(157):145-157, 1971.

Subjects consisted of 84 patients undergoing partial gastrectomy followed by administration of about 2,000 r X-irradiation to the left upper quadrant for gastric hypersecretion associated with peptic ulcer disease. The stomach was irradiated through anterior and posterior portals and the X-ray beam traversed the left kidney. The rate of ulcer recurrence was 12% in both irradiated and nonirradiated control patients treated by the same surgical procedure; the mean time of ulcer recurrence was delayed from 12 months in control patients to 25 months in irradiated patients. Due to the high prevalence of hypertension in this group, results for 67 of the 84 patients who could be followed up for 15-20 yr are presented. Of the 67 patients, 31 were found to have radiation nephritis manifested as hypertension, altered renal functions tests, reduced sized of the left kidney and/or microscopic changes. Of the 31 with renal disease, only 11 were symptomatic presenting (8-14 yr later) with either chronic renal failure (5), malignant hypertension (within 11 months to 8 yr) in 4 or benign hypertension (2). For the whole group of 31, the mean interval from irradiation to detection of renal disease was 9.3 yr (range, 11 mo to 19 yr), while for the 11 symptomatic patients the mean interval was 6.3 yr. Physicians should be aware of hypertension or chronic nephritis as a complication of irradiation therapy for gastric hypersecretion.

3124 BACTERIAL FLORA OF THE JEJUNUM FOLLOWING PEPTIC ULCER SURGERY. (E.) Greenlee, H. B. (VA Hosp., Hines, Ill.), R. Vivit, J. Paez and A. Dietz. *Arch. Surg.* 102(4):260-265, 1971.

Quantitative aerobic and anaerobic culture of jejunal contents was done in 20 patients on whom vagotomy and antrectomy was performed for duodenal ulcer requiring elective surgery, with gastroduodenostomy being used in 16 patients and gastrojejunostomy in 4 patients. Prior to operation, no growth was obtained in the jejunal contents of 8 out of 20 patients, the others having between 10^2 and 10^5 organisms/ml of intestinal juice. In the postoperative studies, all patients demonstrated a significant increase in the number of anaerobic organisms. The colony counts varied from 10^6 to 10^{10} microorganisms/ml of jejunal contents. Aerobic microbial flora demonstrated a similar marked increase following peptic ulcer surgery. No significant trend in types of microorganisms that contributed to the bacterial overgrowth were revealed. There was no correlation between acid output (basal or peak) and number of microorganisms. The observed large numbers of microorganisms in the jejunum following ulcer surgery may relate to several of the postgastrectomy syndromes.

3125 THE EFFECT OF VAGOTOMY AND A DRAINAGE PROCEDURE ON ALCOHOL TOLERANCE. (E.) Fleming, J. A. (Middlesex Hosp., London), S. Haynes and L. P. Le Quesne. *Br. J. Surg.* 58(2): 92-96, 1971.

Oral alcohol-tolerance tests were performed on 20 patients with uncomplicated, chronic duodenal ulcer who were undergoing truncal vagotomy and a drainage procedure before surgery and 4 months postoperatively. Preoperatively, the alcohol-tolerance curves were similar in patients receiving 0.65 g of alcohol/kg body weight (8) and those receiving 0.35 g/kg body weight (12), the peak blood-alcohol concentration occurring at approximately 30 min. after the commencement of the test. Following surgery, the peak alcohol levels were higher (sometimes double the preoperative level), and the peak level occurred sooner after the administration of alcohol (in about one-third of the time) in both the high dose and low dose groups. An increased rate of gastric emptying seemingly accounts for the changes seen after the operative procedure.

3126 MECHANISM OF THE ANTIPEPTIC ACTION OF ANIONIC CARBOHYDRATE AND ITS CLINICAL APPLICATION FOR THE TREATMENT OF PEPTIC ULCER. (E.) Ishimori, A. (Tohoku U. Sch. Med., Sendai, Japan). *Tohoku J. Exp. Med.* 103(2):141-157, 1971.

The relationship between the antipeptic activity and the structure of various anionic carbohydrate preparations and dextran sulfate (DS), and their effect on peptic ulcer were studied in vitro using electrophoresis. The pH activity curves of all proteases isolated from the gastric mucosa by means of DEAE cellulose column chromatography were depressed by DS. The chemical binding of anionic carbohydrates with pepsin and with substrate proteins seems to determine the antipeptic effects. Source and molecular weight of carbohydrate, types and grades of esterification and minerals attached to anionic groups all affected the antipeptic activity of the anionic carbohydrates. Immunoelectrophoretic analysis of the "white coating" which covered the ulcer lesion revealed that it contained proteins of serum origin, including a fibrinogen-like substance which migrated towards the cathode (the opposite direction to plasma fibrinogen). Anionic carbohydrates may be useful in the treatment of peptic ulcer.

3127 THE ACCURATE ASSESSMENT OF MAXIMAL GASTRIC SECRETION IN CONTROL SUBJECTS AND PATIENTS WITH DUODENAL ULCER. (E.) Hassan, M. A. (Middlesex Hosp., London) and M. Hobsley. *Br. J. Surg.* 58(3):171-179, 1971.

A clear correlation was found between maximal gastric secretion and body stature in the control group. There was a correlation coefficient of 0.5481 in 34 subjects between peak acid output and calculated lean body mass. Surface area and height also gave good correlations. Correction for pyloric loss of gastric secretion (with an inert marker, phenol red) improved all the correlations. There was a highly significant correlation between total body potassium and lean body mass; total body potassium gave an even higher correlation with maximal gastric secretion than did calculated lean body mass. Maximal gastric secretion decreased with age, but the sex difference was not statistically significant. In patients with duodenal ulceration there was a correlation between maximal gastric secretion and body stature. On the average, maximal gastric secretion was about 30% higher in these subjects with this effect being due to a minority of patients with hypersecretion. Patients with ulcer history of less than 4 yr secreted proportionately less gastric juice than those with a longer history. It is suggested that gastric hypersecretion may be a result rather than the cause of duodenal ulceration.

3128 THE EVALUATION OF VAGOTOMY AND PYLOROPLASTY IN THE TREATMENT OF DUODENAL ULCER IN NIGERIANS: CLINICAL AND RADIOLOGICAL STUDY. (E.) Solanke, T. F. (Univ. Coll. Hosp., Ibadan, Nigeria) and T. M. Kolawole. *Br. J. Surg.* 58(3):193-198, 1971.

Of 48 patients studied, 29 had uncomplicated duodenal ulceration and 19 had duodenal ulcer associated with stenosis. Most ulcers were seen anterosuperiorly on the first part of the duodenum. Postoperatively, no patients showed gastric retention and most cases gained weight. In the 19 patients with duodenal stenosis treated by vagotomy and a modification of the Weinberg pyloroplasty, the severe stenosis was converted into patulous gastroduodenal channels (that portion of the lumen of the distal antrum and proximal part of the duodenum through which the pyloroplasty incision was made), with no problem of postoperative gastric retention. Retrograde peristalsis was not found in any patients on radiological examination. At follow-up no patients had recurrent ulceration or showed signs of perforation.

29 STUDIES ON PEPTIC ULCER DISEASE WITH
SPECIAL REFERENCE TO THE EFFECT OF 1-
DSCYAMINE. (E.) Walan, A. (Sahlgrenska Hosp.,
teborg, Sweden). *Acta Med. Scand.* Suppl 516:
56, 1970.

eatment with 1-hyoscyamine, an anticholinergic
ug, resulted in a decrease in gastric volume,
id concentration, acid output and pepsin output
sally and also during stimulation with histamine.
Hyoscyamine administration resulted in a shift
the right of the dose-response curve representing
id output in response to pentagastrin. An
crease in pepsin output in relation to acid
tput was larger during treatment with 1-hyoscyamine
an without. The total output of intrinsic
ctor was not changed during treatment with 1-
oscyamine, whether with or without concomitant
stamine stimulation. Treatment with 1-hyoscyamine
be of value in duodenal ulcer disease, and if
ed on a long-term basis would probably not
ter vitamin B_{12} absorption. In a clinical
vestigation, patients with at least 2 episodes
duodenal ulcer who were given 1-hyoscyamine,
monstrated a sustained decrease in basal and
stamine-stimulated acid secretion during the
ole observation period. The decrease in maximal
basal acid output was equal for patients
eated with either high or low doses of this
ug.

30 EFFECTS OF OBSTRUCTIVE JAUNDICE ON
GASTRIC SECRETION OF ACID, PEPSIN,
LFATED POLYSACCHARIDES, AND GLYCOPROTEINS BY
E FUNDAL MUCOSA IN THE DOG. (Fr.) Ectors, P.
t. Pierre U. Hosp., Brussels, Belgium), S.
rbeustel and J. De Graef. *Acta Gastroenterol.*
lg. 33(11):773-783, 1970.

stric secretion was studied in 3 dogs with
idenhain pouches after administration of porcine
strin (the dose required to produce maximum
sponse) or a mixture of histamine hydrochloride
.3 mg/hr) and bethanechol (1.4 mg/hr). Histamine
bethanechol were administered s.c. every 15
for 3 hr. Within 1 week after ligation of
e common bile duct, increased gastric acid
cretion occurred after stimulation by gastrin
histamine + bethanechol. Hypersecretion
rsisted for 4 weeks and then acid secretion
creased. Onset of jaundice was associated with
decrease in gastric pepsin secretion in response
gastrin; a moderate and temporary increase in
psin output was observed after stimulation with
stamine + bethanechol. After 10-24 hr histamine
bethanechol caused the gastric output of
ondroitin sulfate to double; gastrin had too
ttle effect on chondroitin sulfate excretion to
ke it possible to measure its output. Obstructive
undice had no effect on the secretion of glyco-
oteins in visible mucus. Autopsies showed that
of these dogs had 2 duodenal ulcers; 1 ulcer
d perforated. These results suggest that
stric hypersecretion which is secondary to
patic failure results from the presence in the
blood of a secretagogue of hepatic or intestinal origin.

3131 POSTBULBAR DUODENAL ULCER AND RING-STRICTURE. CAUSE AND EFFECT. (E.) Bilbao, M. K. (U. Oregon Med. Sch., Portland), L. H. Frische, J. Rösch, J. A. Benson, Jr. and C. T. Dotter. *Radiology* 100(1):27-35, 1971.

A series of 12 patients with ring stricture of the descending duodenum were, in general older than the typical peptic ulcer patient (29-76 yr), symptomatic for 1-30 yr, and had more severe symptoms than those of the usual peptic ulcer groups. Pain, bleeding and vomiting were present in most patients. Strictures were found only by internal palpation. A stenosis composed of mucosa and submucosa was discovered in 7 patients. No ulcer was found except by inspection via a duodenotomy. Hypotonic duodenography revealed similar findings in 12 patients: preampullary located lesions, eccentrically located lesions, and the absence of a mucosal pattern within the narrowed areas. Although the descending duodenum was only briefly visible in conventional gastrointestinal films because of irritability and poor filling, the stenosis demonstrated by hypotonic duodenography could be distinguished retrospectively in most patients. These strictures apparently were postinflammatory rather than congenital in origin. Healing of active ulceration did not relieve the symptoms; the resulting stricture alone was associated with persistent pain, vomiting and/or bleeding.

3132 THE CONTINUING PROBLEM OF JEJUNAL ULCER. (E.) Small, W. P. (Western Gen. Hosp., Edinburgh, Scotland), C. V. Ruckley, C. W. Falconer, W. Sircus, J. P. A. McManus and J. Bruce. *Am. J. Surg.* 121(5):541-547, 1971.

Over 2 decades, 115 patients with jejunal ulcer, which invariably followed surgery for duodenal ulcer, were treated surgically with a Polya gastrectomy or vagotomy and drainage. The risk of recurring jejunal ulcer, an important source of dyspepsia and bleeding, varied from 15.8% after gastroenterostomy to 3.0% after partial gastrectomy. The majority of patients with duodenal ulcer had acid secretory outputs on maximal stimulation in the range 30-50 mEq and a suitable reduction could be achieved by Polya gastrectomy of moderate extent or by vagotomy. However, if vagotomy is to result as a satisfactory method of treatment and if an increase in the incidence of jejunal ulcer is to be prevented, then the problem of incomplete vagotomy must be solved. Postoperatively, the completeness of gastric vagotomy is indicated by failure of secretory response to insulin-induced hypoglycemia. The incidence of incomplete vagotomy is lower after selective rather than truncal vagotomy.

3133 EFFECT OF OXYPHENCYCLIMINE HYDROCHLORIDE ON BASAL GASTRIC SECRETION OF ACID AND PEPSIN IN MAN. (E.) Berstad, A. (Ulleval Hosp., Oslo, Norway) and J. Myren. *Scand. J. Gastroenterol.* 6(2):155-159, 1971.

The effect of oxyphencyclimine hydrochloride (an anticholinergic drug) on the gastric secretion of acid and pepsin was compared in 13 patients with dyspepsia, 9 of whom had had duodenal ulcers, using a double blind procedure. Oxyphencyclimine (10 mg p.o.) decreased mean volume and acid and pepsin outputs by about 60% compared with placebo. Acid and pepsin concentration and the pepsin:acid ratio were not significantly changed. Generally, the patients tended to fare better on treatment with oxyphencyclimine than with placebo; however, the only significant subjective response to oxyphencyclimine was increased dryness of the mouth. Both dyspepsia and side-effects were similar after 1 week and after 2 months of treatment.

3134 LESIONS OF THE ANTRUM WALL IN GASTRIC ULCER. (Ger.) Liebermann-Meffert, D. (Univ. Surg. Clin., Basel, Switzerland) and M. Allögwer. *Schweiz. Med. Wochenschr.* 101(20): 753-754, 1971.

3135 VAGOTOMY AND PYLOROPLASTY ON THE TREATMENT OF MASSIVE BLEEDING CAUSED BY PEPTIC ULCER. (Sp.) Ferreira Montero, V. *Rev. Esp. Enferm. Apar. Dig.* 34(2):165-182, 1971.

3136 TREATMENT OF POSTOPERATIVE PEPTIC ULCER. (Sp.) Mariscal, G. (Seville, Spain) and M. Láynez. *Rev. Esp. Enferm. Apar. Dig.* 33(5):579-582, 1971.

3137 PLACE OF PSYCHOTHERAPEUTIC AGENTS IN THE TREATMENT OF PEPTIC ULCER. (Sp.) Galán Navarro, J. L. (Sch. Med., Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(5):573-575, 1971.

3138 PEPTIC ULCER IN CHILDREN AND ADOLESCENTS. (Sp.) Jimena Fernandez, H. (Cordoba, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(5): 561-572, 1971.

3139 PANTOTHENIC ACID LEVELS IN BLOOD AND URINE OF PATIENTS WITH DUODENAL ULCER. (E.) Raghavan, P. (Seth G. S. Med. Coll., Bombay, India), B. D. Pimparkar and B. S. Kulkarni. *J. Postgrad. Med.* 17(2):57-63, 1971.

3140 CHYLOUS ASCITES FOLLOWING VAGOTOMY. (E.) Clain, A. (Dudley Road Hosp., Birmingham, England). *Br. J. Surg.* 58(4):312-314, 1971.

3141 AN ASSESSMENT OF POST-VAGOTOMY SEQUELAE IN MY PERSONAL EXPERIENCE OF 845 CASES. (E.) Grassi, G. (San Giovanni Hosp., Rome), C. Orecchia and B. Sbuelz. *Chir. Gastroenterol.* 5(1):110-116, 1971.

3142 THE CHANGING SCENE IN THE SURGICAL TREATMENT OF GASTRIC ULCER. (E.) Braasch, J. W., D. P. Chaudhuri, J. A. Gregg and E. Max. *Surg. Clin. North Am.* 51(3):607-614, 1971.

3143 ENDOSCOPIC CHARACTERISTICS AND MEDICAL MANAGEMENT OF RECURRENT AND RECRUDESCENT GASTRIC ULCER. (Jap.) Kawai, K. (Kyoto Pref. U. Med., Kyoto, Japan). *Stomach Intest. (Tokyo)* 5(13):1645-1653, 1970.

3144 RECURRENCE OF GASTRIC ULCER. WITH REFERENCE TO PAST ENDOSCOPIC FINDINGS OF NEWLY DETECTED ULCER. (Jap.) Fujino, M. (U. Tokyo 1st Dept. Intern. Med.) and E. Kaneko. *Stomach Intest. (Tokyo)* 5(13):1639-1643, 1970.

3145 BEHAVIOR OF THE SECRETION OF FREE HYDROCHLORIC ACID IN PATIENTS SUBJECTED TO SURGERY FOR ULCER PERFORATION. (Pol.) El Lubani, H. (Med. Acad. 1st Surg. Clin, Lodz, Poland), J. Szklanny and S. Sawrasewicz. *Pol. Przegl. Chir.* 42(10):1419-1423, 1970.

3146 THE COURSE OF GASTRIC ULCER SCAR. WITH SPECIAL REFERENCE TO VARIFIED RECURRENCE OF GASTRIC ULCER AND TO FORMATION OF SHORT LINEAR SCAR. (Jap.) Igarashi, T. (Fukushima Med. Coll., Japan). *Stomach Intest. (Tokyo)* 5(13):1627-1637, 1970.

See also numbers: 2707, 2792, 2794, 2931, 3045, 3048, 3059

3147 INTRAPANCREATIC DUODENAL DUPLICATION CAUSING PANCREATITIS IN A CHILD. (E.)

Williams, W. H. (Massachusetts Gen. Hosp., Boston) and W. H. Hendren. *Surgery* 69(5):708-715, 1971.

A case history of a child, who had had recurrent pancreatitis dating from infancy, thought initially to be caused by stenosis of the ampulla of Vater, was reported. The pancreatitis was found later to be due to a congenital cystic duodenal duplication located within the head of the pancreas. Initial surgical management by transduodenal sphincterotomy in infancy was followed by repeated attacks of pancreatitis, cured by subsequent pancreaticoduodenectomy when the child was 8 yr old. Intraoperative pancreatography, using a small amount of contrast medium, soft, flexible blunt ended ureteral catheter and slow injection, is invaluable and was essential to making a correct diagnosis and guiding successful resection in the present case. Although enteric drainage is the procedure of choice in most duodenal duplications, it was not feasible in this particular situation.

3148 DUODENAL DIVERTICULUM TREATED BY EXCISION OF MUCOSAL POUCH ONLY. (E.)

Slater, R. B. (Roy. Naval Hosp., Plymouth, England). *Br. J. Surg.* 58(3):198-201, 1971.

The operative treatment of primary duodenal diverticulum, limited to the second, third and fourth parts of the duodenum and commonly associated with biliary disease, was discussed. A short-circuiting operation such as Polya-type gastrectomy was not preferred, compared to excision, because of the increased morbidity of this procedure and since it is not necessarily curative. The object of excision, as applied to a described case, was to remove the pouch of mucosa which caused symptoms by pressure or which could become inflamed and cause perforation and bleeding. The removal of the pouch could be achieved in difficult situations by duodenotomy, packing the pouch with ribbon gauze to facilitate dissection and removing the mucosal pouch intact by blunt separation of mucosa and serosa. The resulting defect in the duodenal wall can be closed from within. Surgery should not be delayed until development of complications since the operative mortality increases considerably in a group of patients whose average age at operation is >65 yr.

3149 HISTOCOMPATIBILITY AND HETEROTOPIC SEGMENTAL SMALL BOWEL ALLOGRAFT SURVIVAL IN DOGS. (E.)

Westbroek, D. L. (Univ. Hosp., Leiden, Netherlands), C. Rothengatter, H. M. Vriesendorp and J. J. Van Rood. *Eur. Surg. Res.* 2(6):401-407, 1970.

Sixty test sera produced by immunization with skin and segmental small bowel transplants were used to select prospectively litter-mate and non litter-mate donor-recipient canine pairs. A donor-recipient pair was called compatible when less than 5 sera reacted differently (positively or negatively) in the microcytotoxicity test with donor or recipient lymphocytes. Immunosuppressive therapy was not administered. The graft survival time in non litter-mate incompatible dogs (beagles) was low (8.1 days), in non litter mate compatible dogs was significantly higher (27.5 days), and in litter mate compatible dogs was highest (35 days). Histocompatibility apparently plays an important role in canine small bowel survival.

3150 REVERSIBLE NICOTINAMIDE-DEFICIENCY ENCEPHALOPATHY IN A PATIENT WITH JEJUNAL DIVERTICULOSIS. (E.)

Tabaqchali, S. (Roy. Postgrad. Med. Sch., London) and C. Pallis. *Gut* 11(12):1024-1028, 1970.

A case of extensive jejunal diverticulosis and bacterial overgrowth in the small intestine in which the patient developed a severe encephalopathy due to nicotinamide deficiency is presented. The patient also showed steatorrhea, megaloblastic anemia, hypoproteinuria with edema, osteomalacia and abnormalities of hepatic and pancreatic function. The encephalopathy was diagnosed as being due to nicotinamide deficiency because 1) there was a marked similarity between the clinical features exhibited (stupor, neck stiffness, generalized extrapyramidal rigidity, grasp reflexes, and those previously described in nicotinamide deficiency encephalopathy; 2) the clinical and electroencephalographic responses to nicotinamide administration were rapid and complete; 3) the encephalopathic syndrome occurred in association with a severe glossitis; and 4) there was a clinical background of severe malabsorption.

3151 ACUTE DIVERTICULITIS ON THE ILEOCECAL REGION: DIAGNOSIS AND MANAGEMENT.

(E.) Pierce, W. (U. Pennsylvania Hosp., Philadelphia), F. E. Rosàto and E. F. Rosato. *Am. Surg.* 37(7):408-412, 1971.

3152 EFFECTS OF ISOBUTYL CYANOACRYLATE TISSUE ADHESIVE ON SMALL BOWEL ANASTOMOSIS IN PUPPIES. (E.)

Uroskie, T. W. (Hahnemann Med. Coll. Hosp., Philadelphia, Pa.), M. Swank, C. C. Wolferth, Jr. and T. Matsumoto. *Am. Surg.* 37(7):397-404, 1971.

3153 DECOMPRESSION OF THE SMALL INTESTINE BY RETROGRADE INTUBATION. (E.)

Sanderson, E. R. (Seattle, Wash.). *Surg. Gynecol. Obstet.* 132(6):1073-1075, 1971.

3154 CONSTRUCTION OF A CONTINENT ILEOSTOMY. (Ger.) Kock, N. G. (Sahlgrens Hosp., Gothenburg, Sweden). *Schweiz. Med. Wochenschr.* 101(20):729-734, 1971.

3155 TURNOVER OF TAGGED BILE ACIDS IN DISEASES OF THE SMALL INTESTINE. (Ger.) Borel, G. A. (Canton Hosp., Lausanne, Switzerland) and P. Magnenat. *Schweiz. Med. Wochenschr.* 101(20):766, 1971.

3156 THE SURGICAL TREATMENT OF OBESITY. A STUDY IN APPLIED PHYSIOLOGY. (E.) Braasch, J. W. *Surg. Clin. North Am.* 51(3):667-673, 1971.

3157 EXTERNAL SMALL BOWEL FISTULAS. CURRENT TREATMENT AND RESULTS. (E.) Nassos, T. P. and J. W. Braasch. *Surg. Clin. North Am.* 51(3):687-692, 1971.

3158 HEMANGIOPERICYTOMAS OF THE SMALL INTESTINE. (Sp.) Valenzuela Casas, E. *Rev. Esp. Enferm. Apar. Dig.* 33(5):609-612, 1971.

3159 UNUSUAL FOREIGN BODY IN THE DUODENUM. SYNDROME OF PYLORIC STENOSIS. (Sp.) Seoane, D. (Infant Luisa Red. Cross Hosp. Dispen., Seville, Spain) and H. Rodas. *Rev. Esp. Enferm. Apar. Dig.* 33(5):605-608, 1971.

3160 FAMILIAL DIVERTICULOSIS OF THE DUODENUM. (Sp.) Bataller Sifre, R. (Sch. Med. Clin., Valencia, Spain), J. Iborra Baviera and S. Navarro Almudever. *Rev. Esp. Enferm. Apar. Dig.* 34(2):195-198, 1971.

3161 ABNORMAL FINDINGS OF THE HORIZONTAL PART OF THE DUODENUM AND THE ARCUATE PORTION OF THE STOMACH IN AORTOGRAPHY. (Jap.) Katsube, Y. (Tottori U. Sch. Med., Japan), H. Ishikawa, M. Iwamoto and H. Mizugaki. *Rinsho Hoshasen* 15(10):790-793, 1970.

3162 ADENOCARCINOMA OF THE JEJUNUM. (It.) Rosa, G. (U. Inst. Spec. Pathol., Padua, Italy) and G. A. Farello. *Acta Chir. Ital.* 26(2):137-145, 1970.

3163 LEIOMYOSARCOMA OF THE JEJUNUM AND PREGNANCY. (Sp.) Ramirez Soto, E. (IMSS 1st Gynecol. Obstet. Hosp., Mexico City, Mexico), F. Castro Carvajal and S. Valenzuela Lopez. *Ginecol. Obstet. Mex.* 27(164):693-699, 1970.

3164 ROENTGEN DIAGNOSTICS OF SMALL INTESTINE OCCLUSIONS. (Hun.) Nagy, S. (Ujpesti Municipal Hosp., Budapest, Hungary). *Magy. Radiol.* 22(5):274-284, 1970.

3165 PRIMARY TUMOURS OF SMALL INTESTINE MESENTERY. (It.) Arisi, C. (U. Pavia Inst. Gen. Clin. Surg. Italy), L. Colombo and A. De Medici. *Minerva Chir.* 25(21):1424-1441, 1970.

3166 A CASE OF DUODENAL SEGMENTAL ENTERITIS. (It.) Colombo, F. (Maggiore Hosp., Crema, Italy) and A. Privitera. *Minerva Chir.* 25(21):1442-1450, 1970.

3167 PERFORATION OF MECKEL'S DIVERTICULUM BY A FISHBONE, SIMULATING ACUTE APPENDICITIS. (Por.) Barros Passos, D. *Rev. Bras. Cirurg.* 60(3-4):203-206, 1970.

3168 INTRAMURAL HEMATOMA OF THE DUODENUM. (It.) Tessari, R. (U. Bologna Inst. Gen. Clin. Ther. Surg., Italy) and L. Gava. *Romagna Med.* 22(2):179-194, 1970.

3169 DUODENAL LEIOMYOMA CAUSING STENOSIS. DUODENOPANCREATECTOMY. (Rum.) Bancu; E. (Ist. Surg Clin., Tirgu Mures, Rumania), B. Hornyak, C. Craciun and I. Cretu. *Rev. Med. (Tirgu Mures)* 16(2):219-221, 1970.

3170 DUODENAL ADENOCARCINOMA WITH ULCERATION. (Fr.) Grosdidier, J. (Sch. Med. Surg. Clin. C, Nancy, France) and F. Guibal. *Sem. Hop. Paris* 46(41):2602-2603, 1970.

3171 PRIMARY TUMORS OF THE SMALL INTESTINE. (Dan.) Linde, N. C. (City Hosp., Vejle, Denmark). *Ugeskr. Laeger.* 132(41):1909-1913, 1970.

3172 TRANSDUODENAL PAPILLECTOMY FOR CANCER WITH THE USE OF TEFLON PROSTHESES DRAINAGE. (Rus.) Khaspekov Terpanosian, K. G. *Vestn. Khir.* 105(9):48-51, 1970.

3173 UNUSUAL BENIGN CHANGES IN THE DUODENUM. (Ger.) Schellhas, H. (Med. Clin., Bad Cannstatt, Germany) and H. Petzel. *Fortschr. Geb. Roentgenstr. Nuklearmed* 114(2):253-259, 1971.

3174 THE DIAGNOSIS OF EXTRABULBAR DUODENAL ULCERS. (Rus.) Miliutina, V. N. and V. V. Schedrunov. *Sov. Med.* 34(1):60-64, 1971.

3175 DUODENAL AND JEJUNAL DIVERTICULOSIS. (Jap.) Sakai, S. (Kurume U. Sch. Med., Japan), T. Kitazaki and H. Ikezaki. *Rinsho Hoshasen* 15(10):764-767, 1970.

176 ROLE OF OCCULT ALIMENTARY TRACT HEMORRHAGES IN THE CAUSATION OF ANEMIA OLLOWING EXTENSIVE BOWEL RESECTIONS AND OF THE LIND LOOP SYNDROME. (Fr.) Brassinne, A. (U. iege Inst. Med., Belgium). *Acta Gastroenterol. elg.* 33(10):681-697, 1970.

177 PEUTZ-JEGHERS SYNDROME. (Fr.) Etienne, P. (CHU Surg. Clin. B, Rennes, France), . Le Beguec and J. Feuillu. *Arch. Med. Ouest* (6):373-378, 1970.

178 PEUTZ-JEGHERS SYNDROME. (Pol.) Krajka, K. (Med. Acad. 2nd Surg. Clin., Gdansk, oland), Z. Jonas and S. Bereza. *Pol. Tyg. Lek.* 5(52):2033-2034, 1970.

3179 INTESTINAL ABSORPTION IN PARKINSON'S SYNDROME. (Sw.) Jagenburg, R. (U. Goteborg Dept. Clin. Chem., Sweden). *Lakartidningen* 67(42):4842-4844, 1970.

3180 THE POTASSIUM DEPLETION STATES AND POSTOPERATIVE ILEUS. THE ROLE OF THE POTASSIUM ION. (E.) Lowman, R. M. (Yale U. Sch. Med., New Haven, Conn.). *Radiology* 98(3):691-694, 1971.

3181 RADIOLOGICAL EXAMINATION IN CASES OF TUBERCULOSIS OF THE ILEOCECAL REGION. (Pol.) Kulicz, A. (Med. Acad. Radiol. Inst., Zabrze, Poland). *Pol. Przegl. Radiol.* 34(5): 695-700, 1970.

See also numbers: 2709, 2913, 2916, 2942, 2973, 2974, 3060, 3077, 3117, 3190, 3228, 3305, 3327, 3487

REGIONAL ENTERITIS

182 CROHN'S DISEASE INITIALLY CONFINED TO THE APPENDIX. (E.) Ewen, S. W. B. U. Aberdeen Dept. Pathol., Scotland), J. Anderson, . M. D. Galloway, J. D. B. Miller and J. Kyle. *astroenterology* 60(5):853-857, 1971.

hree cases of Crohn's disease initially localized n the appendix, which were observed in a series f 185 patients with Crohn's disease collected in ortheast Scotland between 1955 and 1969, are resented. Two of the 3 patients eventually eveloped evidence of the disease elsewhere in he intestinal tract. In all 3 cases the observed arcoid reaction was attributed to Crohn's isease and was the same as that encountered in he appendices of patients who had widespread rohn's disease in the ileocecal region. In none of the 3 cases was there histological evidence of inclusion bodies which are frequently present in the sarcoid reaction of sarcoidosis. Tuberculosis and mycotic infection were also eliminated on histological evidence.

3183 EXPERIENCE OF CROHN'S DISEASE. (Ger.) Akovbiantz, A., A. Weber and M. Knoblauch (Univ. Med. Clin., Zurich, Switzerland). *Schweiz. Med. Wochenschr.* 101(20):764-766, 1971.

3184 CLINICAL EXPERIENCE WITH CROHN'S DISEASE. (Sp.) De La Santa (City Social Security San tar., Seville, Spain), Carneado and F. Andréu Kern. *Rev. Esp. Enferm. Apar. Dig.* 33(5):613-622, 1971.

See also numbers: 3192, 3229, 3287, 3288, 3289, 3290, 3295, 3296

3185 COMPARATIVE ULTRASTRUCTURAL AND CLINICAL STUDIES ON THE COURSE OF WHIPPLE'S DISEASE. (Ger.) Otto, H. F. (U. Hamburg Pathol. Inst., Germany) and F. Begemann. *Virchows Arch.* [*Pathol. Anat.*] 350(4):368-388, 1970.

Biopsies from the small intestine of a 43-year-old man with Whipple's disease revealed the presence of partial villous atrophy and sickleform particles containing cells which stained intensely with periodic acid-Schiff (PAS) reagent. Electron microscopy showed heavy bacterial infiltration of the stratum proprium. During therapy with tetracycline, anabolic steroids, and infusions of human albumin, amino acid solutions, potassium, iron, and vitamins, lysis of bacterial cytoplasm occurred in vacuoles which appear to correspond to PAS-positive inclusion bodies; these structures are probably lysosomes. Considerable changes in microvillar enterocytes were still present for a long time after clinical improvement. On the basis of these findings and other reports in the literature, it is hypothesized that a disturbance in lymph flow resulting from infiltrates of bacteria and macrophages is the most important factor causing malabsorption in Whipple's disease.

3186 GALLBLADDER INERTIA AND SLUGGISH ENTEROHEPATIC CIRCULATION OF BILE-SALTS IN COELIAC DISEASE. (E.) Low-Beer, T. S. (U. Bristol Dept. Med., England), S. T. Heaton, K. W. Heaton and A. E. Read. *Lancet* 1(7707):991-994, 1971.

More patients with celiac disease were assessed as having absent or minimal contraction of the gallbladder in response to a fatty meal than in controls. The enterohepatic circulation was abnormally slow in patients with celiac disease, as reflected by radioactive taurocholate specific activity. There was also a significant reduction in recirculation of bacterially altered bile salts in patients with celiac disease. Deficient cholecystokinin release from damaged intestinal mucosa apparently not only explains radiological findings of gallbladder inertia, but also explains data showing a sluggish enterohepatic circulation of bile salts.

3187 IMMUNOGLOBULIN-CONTAINING CELLS IN THE COELIAC SYNDROME. (E.) Pettingale, K. W. (King's Coll. Hosp. Med. Sch., London). *Gut* 12(4):291-296, 1971.

Histological examination of small intestinal mucosa from 7 patients with celiac syndrome revealed subtotal villous atrophy in 6, the remaining patient together with 6 control subjects showing normal villous morphology. In the group with normal jejunal histology, the fluorescence obtained with IgA antisera appeared to be more abundant than that obtained by either IgM or IgG. Less fluorescence was seen at the tips than at the bases of the villi. The cell population densities were higher than those reported previously. While some patients with subtotal villous atrophy showed a predominance of Ig-A containing cells in approximately the relative proportions as found in the group with normal histology, others had a decrease in the number of IgA cells so that the predominant cell type was IgM. The mean density of Ig-A containin cells was significantly lower in the atrophy group than in the group with normal histology. A positive correlation was observed between serum IgM levels and the density of corresponding immunoglobulin-containing cells.

3188 TREHALOSE MALABSORPTION CAUSING INTOLERANCE TO MUSHROOMS. REPORT OF A PROBABLE CAUSE. (E.) Bergoz, R. (Canton Hosp. Med. Clin., Geneva, Switzerland). *Gastroenterolo* 60(5):909-912, 1971.

A 71-yr-old woman, hospitalized for abdominal pain, mentioned a selective digestive intolerance to mushrooms. During a trehalose (a disaccharide which occurs in some mushrooms) tolerance test, the patient suffered from abdominal cramps, bloating, and presented 6 liquid stools starting 70 min after trehalose ingestion. Glucose, maltose, and sucrose were tolerated normally. Neither in 16 normal subjects nor in a sprue patient did the trehalose tolerance tests elicit any such symptom. Results indicate a selective malabsorption of trehalose with diarrhea occurrin during the trehalose tolerance test, suggesting a deficiency in intestinal trehalose.

3189 VITAMIN B_{12} AND FOLIC ACID STATUS IN TROPICAL SPRUE. (E.) Mehta, S. K. (Inst. Postgrad. Med. Educat. Res., Chandigarh, India), M. V. Vishwanath, K. K. Khurana and P. N. Chhuttani. *Indian J. Med. Res.* 59(2): 265-270, 1971.

Jejunal biopsy revealed partial villous atrophy in 94% of 30 patients with tropical sprue. Vitamin B_{12} and serum folic acid levels were decreased in 50% and 65% of the patients, resp. Both values were abnormal in 29.2% of the patients. In spite of a normoblastic bone marrow, the serum B_{12} level was low in 12 of 20 patients. Folic acid was also low in most of these patients, hence serum vitamin levels were probably disturbed prior to disturbances in bone marrow morphology.

3190 ROLE OF THE SMALL BOWEL AND COLON IN LACTOSE-INDUCED DIARRHEA. (E.) Christopher, N. L. and T. M. Bayless (Johns Hopkins Hosp., Baltimore, Md.). *Gastroenterolog* 60(5):845-852, 1971.

The net secretory response of the small intestine to unhydrolyzed lactose was compared with the secretory response to an osmotically equivalent amount of mannitol, and the role of both the small bowel and colon in the production of diarrhea fluid in lactase-deficient subjects was studied. Lactase-deficient individuals exhibited significant net secretion in the stomach, duodenum, and jejunum, and by midileum, there was a 5-fold dilution of the test solution. An osmotically equivalent amount of mannitol elicited the same secretory response. By the time either test solution had reached the proximal jejunum, the osmolality had decreased by 50% to 300 milliosmoles/kg and remained so in the ileum. The pH of the ileal contents was alkaline in 4 of 5 subjects following lactose or mannitol ingestion. Lactose administration to lactase-deficient subjects was followed by an interference with net fluid absorption in the colon. No net secretion was observed in the colon. These subjects had acidic stools (pH 5.8) with an osmolality of 379 milliosmoles/kg, possibly due to bacterial fermentation of the undigested lactose.

3191 BETA-GALACTOSIDASE AND BETA-GLUCURONIDASE ACTIVITIES IN INTESTINAL MUCOSA OF INFANTS AND CHILDREN. (E.) Antonowicz, I. and H. Schwachman (Child. Hosp. Med. Ctr., Boston, Mass.). *Pediatrics* 47(4):737-744, 1971.

In the acute stage of celiac disease, patients showed altered intestinal mucosal histology, decreased lactase and hetero-β-galactosidase values and normal β-glucuronidase values. Patients with treated celiac disease (gluten-free diet) demonstrated normal α-glucosidases, hetero-β-galactosidase and β-glucuronidase but showed decreased lactase values. The lysosomal enzymes hetero-β-galactosidase and β-glucuronidase were not strikingly affected in patients with cystic fibrosis. The reduction of hetero-β-galactosidase is not consistent enough and not specific enough to be used as a diagnostic criterion for any of the clinical conditions examined.

3192 DIPEPTIDASE DEFICIENCY AND MALABSORPTION OF GLYCYLGLYCINE IN DISEASE STATES. (E.) Sadikali, F. (Makerere U. Dept. Med., Kampala, Uganda). *Gut* 12(4):276-283, 1971.

Peroral jejunal biopsies from a group of 37 patients with and without gastrointestinal symptoms were assayed for hydrolase activity for glycylglycine, glycyl-L-leucine, and L-leucylglycine. A marked decrease in the activity of all 3 hydrolases, especially glycylglycine dipeptidase, was observed in 8 patients, 4 of whom had Crohn's disease. In the patients showing reduced enzyme activity, glycylglycine malabsorption was evident; however, glycine absorption was similar in these patients and those with normal dipeptidase levels. The biopsies were morphologically and histologically normal in all patients with peptidase deficiency, except for one patient with Crohn's disease where the biopsy showed minor morphological abnormalities under the dissecting microscope but was histologically normal. Thus, even when the mucosa is histologically normal, significant peptidase deficiency may occur.

3193 FUNCTIONAL RESPONSE OF THE DIGESTIVE TRACT TO THE INGESTION OF MILK IN LACTOSE INTOLERANCE. (Cz.) Pirk, F. (Res. Inst. Human Nutr., Prague) and I. Skála. *Cesk. Gastroenterol. Vyz.* 25(3):81-89, 1971.

3194 LACTOSE MALABSORPTION IN ARABS. (Sp.) Peña Yañez, A. (U. Granada Med. Clin., Spain), J. F. Peña Angulo and J. Rico Irles. *Rev. Esp. Enferm. Apar. Dig.* 34(1):13-24, 1971.

3195 ONE CASE OF CELIAC-SPRUE DISEASE DETECTED AFTER GASTRIC RESECTION. (Fr.) Celle, G. (U. Genoa Inst. Intern. Med., Italy), M. Dodero, G. Ciravegna and P. Michetti. *Arch. Fr. Mal. App. Dig.* 60(3):109-122, 1970.

3196 RECENT STUDIES ON INTESTINAL MALABSORPTION. (Fr.) Cerf, M. *Concours Med.* 92(39):6963-6970, 1970.

3197 CHRONIC DIARRHEAS AND ALLERGY TO YEAST. (Fr.) Miller, G. (Zuchwilerstr. 43, Solothurn, Switzerland). *Med. Hyg. (Geneve)* 28(930):1345, 1970.

3198 SPRUE LIKE SYNDROME IN SYSTEMIC SCLERODERMA. (Rus.) Miagkova, L. P. and N. G. Guseva. *Sov. Med.* 33(9):113-116, 1970.

3199 JEJUNAL HISTOLOGY AND CLINICAL STATUS IN TROPICAL SPRUE AND OTHER CHRONIC DIARRHEAL DISORDERS. (E.) Bayless, T. M. (U.S. Army Trop. Res. Med. Lab., San Juan, Puerto Rico), V. L. Swanson and M. S. Wheby. *Am. J. Clin. Nutr.* 24(1):112-116, 1971.

3200 REGRESSIVE VACUOLAR MYOPATHY IN STEATORRHEA. ELECTROPHYSIOLOGICAL AND HISTOLOGICAL STUDY. (E.) Coers, C. (U. Brussels Brugmann Hosp., Belgium), N. Telerman Toppet and M. Cremer. *Arch. Neurol.* 24(3):217-227, 1971.

3201 TECHNIQUES OF DETECTION AND EXPLORATION OF DISACCHARIDE MALABSORPTION DISORDERS IN PEDIATRICS. (Fr.) Huguet, R. (St. Charles Clin. Montpellier, France), R. Jean and M. Solere. *Trav. Soc. Pharm. Montpellier* 30(2):121-128, 1970.

3202 INTESTINAL DISACCHARIDASE ACTIVITY IN MALNUTRITION. (Sp.) Cuellar, A. (IMSS Natl. Med. Ctr., Mexico City, Mexico), J. Luengas and S. Frenk. *Minerva Pediatr* 22(24): 1222, 1970.

3203 ENTERIC PROTEIN LOSS SYNDROME IN A DOG. (Ger.) Schwartz Porsche, D. M. (Free U. Berlin Small Anim. Clin.), C. Kasbohm and A. Scholz. *Zentralbl. Veterinarmed.* [*A*] 17(8): 665-684, 1970.

3204 CURRENT PROBLEMS IN PROLONGED INFANTILE DIARRHEAS. (Rum.) Petrescu Coman, V. (COPII Cent. Hosp., Bucharest, Rumania), S. Sanielevici Marinov and S. Popescu Miclosan. *Pediatria (Bucur.)* 19(4):313-324, 1970.

See also numbers: 3061, 3547

3205 SEGMENTAL TUBERCULOSIS OF THE COLON. REPORT OF TEN CASES. (E.) Chawla, S. (Lady Hardinge Med. Coll. Hosp., New Delhi, India), P. Mukerjee and K. Bery. *Clin. Radiol.* 22(1):104-109, 1971.

Ten cases of tuberculous lesions of the colon distal to the ileocecal region in young Indian women are presented. Tuberculosis of the colon and the rectum is essentially a complication of pulmonary tuberculosis; however, the hyperplastic or hypertrophic variety occurs in the absence of pulmonary tuberculosis in approximately 70% of cases. Obstruction is common in the hyperplastic type, due to the encroachment of the thickened wall upon the lumen combined with contraction of scar tissue, intraperitoneal adhesions and retraction of the mesentery. Multiplicity of lesions, younger age (20-40 yr) and the presence of a lesion in the lungs may help in distinguishing tuberculosis of the distal colon from carcinoma. Stasis is more marked in malignancy than in benign strictures. In addition to malignancy, the disease has to be differentiated from other benign strictures, particularly Crohn's disease and ulcerative colitis.

3206 FAMILIAL POLYPOSIS OF THE COLON WITH SPECIAL REFERENCE TO REGRESSION OF RECTAL POLYPOSIS AFTER SUBTOTAL COLECTOMY. (E.) Shepherd, J. A. (Broadgreen Hosp., Liverpool, England). *Br. J. Surg.* 58(2):85-91, 1971.

Familial polyposis of the colon was observed in 2 families. The first family showed the characteristics of the common type of familial polyposis with a suggestion that the condition appears later in males than in females. Throughout this family there was no evidence of other hereditary disease. In the second family, in addition to familial polyposis, there was a risk of inheritance of sebaceous cysts, multiple fibromata, and possibly hemangiomata. Subtotal colectomy with ileorectal anastomosis was preferable to immediate colectomy and ileostomy in the young adult or adolescent. After the initial prophylactic surgery, rectal polyps were not treated for 6 months, spontaneous regression being more frequent than is commonly accepted. In the event of uncontrolled polyposis or malignant change, a second operative procedure may be necessary, and when there is no spontaneous regression, fulguration of residual polyps should be performed.

3207 OBSTRUCTION AND PERFORATION IN COLORECTAL CANCER. (E.) Glenn, F. (New York Hosp.-Cornell Med. Ctr., N. Y.) and C. K. McSherry. *Ann. Surg.* 173(6):983-992, 1971.

The records of 1,815 patients with carcinoma of the colon and rectum seen over a 33-yr period (1932-1955) were reviewed. Of this group, 11.6% (210) had complete large bowel obstruction, 5.5% (99) had perforation, and 1.7% (30) had both obstruction and perforation. Curative resection was performed in 46.7% of the patients with obstruction, with a 5-yr survival rate of 19.5% and an operative mortality of 12.7%. In 65.7% of the patients with perforating carcinoma, curative resection was performed with an operative mortality of 15.3% and a 5-yr survival rate of 28.3%. Curative resection was possible in 60% of the patients with obstruction and perforation. In this group the operative mortality was 31% and the 5 yr survival rate was 6.7%. In view of the poor prognosis associated with the complications of obstruction and perforation, diagnosis and treatment before the onset of these complications will seemingly improve survival statistics.

3208 COLONIC DIVERTICULAR DISEASE: CHANGING OPERATIVE MANAGEMENT. (E.) Floyd, R. D. (St. Joseph's Hosp., Lexington, Ky.) and W. O. Griffen, Jr. *Ann. Surg.* 173(6):979-982, 1971.

The records of 343 cases of diverticular disease of the colon seen over an 8-yr period (1962-1970) were reviewed. One hundred patients (29%) required surgical intervention, most commonly indicated by acute inflammatory reaction with or without pelvic abscess which occurred in 54 patients, or an acute perforation (18 patients). Seventy-three patients had primary resections with anastomoses, with a mortality rate of 1.4%. Morbidity and mortality occurred most frequently in patients requiring staged procedures or who were poor risks, with the overall morbidity and mortality being 19% and 4%, resp. Complications included stress ulcer, septicemia, depression, pelvic abscess, electrolyte imbalance, drug eruption and colocutaneous fistula. Resection before significant complications have occurred seemingly improves the survival of patients and is therefore advised in the operative management of this disease.

3209 HETEROTRANSPLANTATION OF HUMAN ADENOCARCINOMAS OF THE COLON AND RECTUM TO THE MOUSE MUTANT NUDE. A STUDY OF NINE CONSECUTIVE TRANSPLANTATIONS. (E.) Povlsen, C. O. (Municipal Hosp., Copenhagen, Denmark) and J. Rygaard. *Acta Pathol. Microbiol. Scand.* [*A*] 79(2):159-169, 1971.

The growth pattern of human carcinomas of the colon and rectum in the mouse mutant Nude was studied in 9 consecutive heterotransplantations. Six out of the 9 transplants were successful, with 5 of the tumors being transplanted serially for 2-8 transfers. The degree of differentiation of the donor tumors did not seem to have any influence, as growth was obtained with well, intermediately, and poorly differentiated tumors.

The time from removal to implantation of tumor tissue did not seem to be critical within the intervals used (15-45 min). Tumor growth was recognized between 10 and 14 days following inoculation. The 3 tumors which did not grow did not differ in histological appearance from the tumors that did take. The histology and cytology of the successful transplants were identical with those of the primary tumors. Transfers were more successful using solid tumor blocks rather than tumor suspensions. Local growth was common to the transplanted tumors. The mutant Nude seems to be a suitable host for various human malignant tumors.

3210 EXSANGUINATING ARTERIAL BLEEDING ASSOCIATED WITH DIVERTICULATING DISEASE OF THE COLON. (E.) Sorger, K. (Mt. Auburn Hosp., Cambridge, Mass.) and M. R. Wacks. *Arch. Surg.* 102(1):9-13, 1971.

Three cases of diverticular disease of the colon in which massive arterial bleeding occurred are reported. In all 3 cases, the gross manifestation that led to the detection of the bleeding site was a thrombus, which protruded like a horn for several millimeters above the surrounding bowel mucosa. The thrombus was composed of fibrin, erythrocytes, and remnants of vessel wall, and was attached firmly to the diverticular wall. The chances for recovery of the elderly, arteriosclerotic, and hypertensive patient can seemingly be increased if the lesion can be located and thus the point of bleeding identified after limited surgical resection.

3211 CARCINOMA OF THE COLON. A REVIEW OF 554 PATIENTS. (E.) Balslev, I. (Municipal Hosp., Copenhagen, Denmark), H.-E. Jensen and J. Nielsen. *Acta Chir. Scand.* 137(2): 175-179, 1971.

The average duration of symptoms in 554 patients with carcinoma of the colon was 6 months, these symptoms including lost appetite, weight loss, tiredness, constipation, melena, and anemia. One-third of the patients had other coincidental complicating disease, predominantly heart disease. Tumors were demonstrated at first examination in 85% of the patients with barium enemas. In most patients, tumors were removed at hemicolectomy or other resection. Operative mortality overall was 10%, but in patients with heart disease 22%. Most patients not undergoing resection died within a yr, whereas, the 5-yr survival rate in the 406 patients undergoing resection or hemicolectomy was 45%. Prognosis was best when tumors were located in the transverse or sigmoid colon and poorest when located at the splenic flexure. If the 15-yr study here presented is considered as three 5-yr periods it appears that the average age was slightly higher in the last 5 yr, frequencies of resection and mortality rose, and 5 yr survival rates remained constant.

Previous changes in surgical techniques seem to be of no practical significance in improving 5-yr survival rates, and apparently any possible improvement depends on nonsurgical factors.

3212 PERFORATED SIGMOID DIVERTICULITIS. APPRAISAL OF PRIMARY VERSUS DELAYED RESECTION. (E.) Miller, D. W., Jr. (Roosevelt Hosp., New York, N. Y.) and W. A. Wichern, Jr. *Am. J. Surg.* 121(5):536-540, 1971.

Forty patients with perforation of the sigmoid colon secondary to diverticulitis were managed surgically. Free perforation with diffusing peritonitis had a higher mortality than perforatic leading to pericolic and mesocolic abscess formation. Preliminary transverse colostomy and delayed resection as a 2- or 3-stage procedure proved to be an effective procedure in 24 patients. Primary resection without anastomosis, more feasible when abscess formation was confined between the leaves of the sigmoid mesentery, was used in 6 patients with excellent results. The length of hospitalization was greater in patients receiving delayed versus primary resection. The benefits of immediate excision of diseased perforated colon are obtained in patients with free perforation and diffusing peritonitis or pericolic abscess, but the hazards (anastomotic leaks) of an immediate anastomosis are avoided by the 2-stage procedure of primary resection without anastomosis.

3213 VOLVULUS OF THE TRANSVERSE COLON. (E.) Cuderman, B. S. (U. Minnesota Hosps., Minneapolis), S. A. Roback, W. H. Weintraub and A. S. Leonard. *Surgery* 69(5):797-799, 1971.

A single case is reported dealing with a 10-yr-old mentally retarded white female with a life-long history of episodes of acute abdominal distention and emesis accompanied by obstipation. At laparotomy, the peritoneal cavity was found to contain cloudy feculent fluid. A volvulus of the transverse colon was present with gangrene of the involved colon. The transverse colon was freely movable with no evidence of obstructing neoplasm, adhesions or congenital bands. The distention was immediately relieved by needle decompression and the middle colic artery and vein were ligated to prevent absorption of toxins A transverse colectomy was performed together with exteriorization of an ascending colostomy and a descending mucous fistula. Culture of the peritoneal fluid revealed no growth. Her postoperative course was uneventful, with discharge on the twelfth postoperative day. She returned 6 weeks later for construction of a colocolostomy. Biopsy of the colostomy, mucous fistula and rectum demonstrated normal ganglion cells.

3214 THE COLONIC PERICRYPTAL FIBROBLAST SHEATH: REPLICATION, MIGRATION, AND CYTODIFFERENTIATION OF A MESENCHYMAL CELL SYSTEM IN ADULT TISSUE. III. REPLICATION AND DIFFERENTIATION IN HUMAN HYPERPLASTIC AND ADENOMATOUS POLYPS. (E.) Kaye, G. I. (Columbia U. Coll. Physicians Surg., New York, N. Y.), R. R. Pascal and N. Lane. *Gastroenterology* 60(4):515-536, 1971.

Electron microscopic and autoradiographic studies showed that the pericryptal fibroblast sheath of the hyperplastic human colonic polyp was itself hyperplastic and that the cells and cell products of the sheath were as fully differentiated as the epithelium that it subtends. Conversely, the pericryptal sheath fibroblasts of adenomatous polyps were as immature as the epithelial cells which they subtend. The pericryptal fibroblast sheath of the adenomatous polyp was characterized by fibroblasts which often have unusual or abnormal fine structure, which produce little, if any, recognizable collagen and which continue to divide in the upper one-third of the crypt and at the free surface. Fibroblasts in adenomatous polyps with large lipid and vacuolar inclusions resemble fibroblasts of healing wounds in scorbutic animals. Results of the present study confirm previous suggestions that the above 2 lesions may represent divergent extremes of the normal differentiation of the colonic mucosa.

3215 MINUTE ADENOMATOUS AND HYPERPLASTIC POLYPS OF THE COLON: DIVERGENT PATTERNS OF EPITHELIAL GROWTH WITH SPECIFIC ASSOCIATED MESENCHYMAL CHANGES. CONTRASTING ROLES IN THE PATHOGENESIS OF CARCINOMA. (E.) Lane, N. (630 W. 168th St., New York, N. Y.), H. Kaplan and R. R. Pascal. *Gastroenterology* 60(4): 537-551, 1971.

Histological examination of polypoid lesions of the colon and rectum under 3 mm in diameter revealed the majority to be nonneoplastic (hyperplastic polyps), while less than 10% were true neoplasms (adenomatous polyps). In the hyperplastic polyp, the trend toward orderly differentiation into 2 cell types from depth to surface was unmistakable. The gradual orderly development of goblet and absorptive cells was a consistent finding. With mucicarmine and periodic acid-Schiff (PAS) staining, there was a positive reaction in all tubules. An opposite pattern prevailed in the adenomatous polyp, reflecting a failure of orderly cytodifferentiation. Opposite patterns of mesenchymal changes were also seen with hyperplastic polyps and was associated with an extremely thick basement membrane and increased (compared to normal) PAS staining of the interface between basement membrane and epithelium. No transition from hyperplastic to adenomatous mucosa was observed. Apparently, only the adenomatous polyp is of any possible significance in colonic carcinogenesis.

3216 ANALYTICAL STUDY OF A STATISTICAL SURVEY COVERING 200 RECTOCOLON ADENOMAS IN ADULTS. (E.) Duhamel, J. (St. Antoine Hosp., Paris) and Ngo-Quang-Binh. *Am. J. Proctol.* 22(3):196-202, 1971.

More than 75% of 200 rectocolon adenomas examined were found to occur in males; however, the male sex predominance was only marked in the forms of adenoma without dedifferentiation. The incidence of rectocolon adenoma increased linearly with respect to age (between 30 and 80) thus adenomas apparently do not sustain a time degenerative development. Of 90 large (6-10 mm diameter) polyps, 40 were benign and 50 were malignant or suspect. However, of 29 very large polyps (larger than 10 mm), 25 were suspect or malignant polyps. Malignant and benign states were found equally in pediculated polyps, hence existence of a pedicle has no value for or against malignancy. Malignancy was more frequently observed in multiple polyp cases. There is more often a lack of conformity between the benign histological types and the malignant (or suspect) types, rather than similarity. The same lack of conformity obtains in the association of the usual cancers and adenomas.

3217 ASSESSMENT OF CONTINENCE AFTER TREATMENT FOR ANORECTAL AGENESIS: A CLINICAL AND RADIOLOGOC CORRELATION. (E.) Cywes, S. (Red Cross War Mem. Child. Hosp., Cape Town, South Africa), B. J. Cremin and J. H. Louw. *J. Pediatr. Surg.* 6(2, Pt. 1):132-137, 1971.

Following treatment for anorectal agenesis, the defecation movements in 28 patients were studied by command stopping and starting and also by the ability to maintain continence during coughing, crying, or during periods of rectal peristalsis. The reaction of the puborectalis was the most important single factor in maintaining continence. All patients who had good results on clinical grounds also had good function and control on radiologic assessment, and similarly those who had clinically poor results, also had poorly functioning sphincters on radiological examination. Patients who received sacroperineal or sacro-abdomino-perineal rectoplasty did better than those receiving abdomino-perineal rectoplasty indicating that the precise localization of the puborectalis at operation via the sacral approach undoubtedly improved the long-term results.

3218 HETEROTOPIC GASTRIC EPITHELIUM IN THE RECTUM: A REPORT OF THREE NEW CASES WITH A REVIEW OF 87 CASES OF GASTRIC HETEROTOPIA IN THE ALIMENTARY CANAL. (E.) Wolff, M. (Columbia U. Coll. Physicians Surg., New York, N. Y.). *Am. J. Clin. Pathol.* 55(5):604-616, 1971.

Three cases of heterotopic gastric epithelium in the rectum, unassociated with any other known anomalies, are presented. In one of the cases, the anomaly occurred at the anorectal junction and consisted exclusively of pyloric glands. From an analysis of 87 cases of heterotopia of gastric epithelium in the gastrointestinal tract, it was concluded that pyloric glandular heterotopia anywhere in the intestinal tract, when seen alone, is probably a sequel to a healed inflammatory condition. Furthermore, the finding of more than one mucosal type in an ectopic focus denotes a developmental accident. Fully formed fundic heterotopic mucosa seemingly represents a congenital malformation, whereas the partial replication of fundic mucosa may be acquired. The presence of only scattered chief and parietal cells seems to indicate an acquired heterotopia, while a heterotopia of full thickness which is completely structured and of gastric fundic mucosa is probably a developmental defect.

3219 THE TREATMENT AND CARE OF ANAL FISTULAS: A STUDY OF 1,000 PATIENTS. (E.) Mazier, W. P. (Ferguson Clin., Grand Rapids, Mich.). *Dis. Colon Rectum* 14(2):134-144, 1971.

The records of 1000 patients treated at the Ferguson Clinic for fistulous abscess of the anus were reviewed. Fistulectomy was listed as the definitive procedure in 91.2% of the cases, and hemorrhoidectomy was part of the surgical procedure in 64.4%. The left lateral decubitus position was used exclusively for these procedures. The use of local anesthesia and epinephrine (xylocaine, .5%, with epinephrine 1:200,000) resulted in far less bleeding at operation than other types of anesthesia. Postoperatively, 73.5% of patients needed 1, 2, or 3 injections for pain. Of the patients who needed more than 5 injections for pain, 76% had had hemorrhoidectomies as part of their surgical procedures. There were no postoperative complications in 94.6% of the patients, and the average length of stay in the hospital after surgery was 7.3 days. Recurrences were recorded in 39 cases (3.9%), 82% of which occurred within the first year postoperatively.

3220 HEMORRHOIDECTOMY REVISITED - A COMPUTER ANALYSIS OF 2,038 CASES. (E.) Ganchrow, M. I., W. P. Mazier (Ferguson Clin., Grand Rapids, Mich.), W. G. Friend and J. A. Ferguson. *Dis. Colon Rectum* 14(2):128-133, 1971.

An analysis of 2,038 hemorrhoidectomies showed advantages of closed hemorrhoidectomy to include: complete removal of hemorrhoidal varices, complete relining of the anal canal in its outer two thirds with squamous epithelium, no need for operative or postoperative anal dilation, and minimal outpatient-care. The decreased incidence of pain and the shorter convalescence afforded by the closed versus open technic of hemorrhoidectomy have been verified by others. Only 3 patients in the present series followed for more than 5 yr underwent subsequent excision of hemorrhoidal tissue. The total number of patients with any type of perianal or anal disease amounted to 4.87% and not all of these patients needed operations. The incidence of post operative abscess was very low (0.02%) following primary closure of hemorrhoidectomy incisions.

3221 ETHNIC DIFFERENCES IN OCCURRENCE OF RECTAL POLYPOSIS IN OVER 6000 PROCTOSCOPIES. (E.) Eichhorn, R. D. (Kelsey-Seybold Clin., Houston, Tex.), P. S. Bentlif and J. R. Kelsey. *Am. J. Dig. Dis.* 16(5):433-435, 1971.

North Americans had a higher incidence of rectal polyps than Gentile and Jewish Mexicans. Only 10 invasive carcinomas were discovered in more than 6000 patients. In no case was a carcinoma found in a patient who was asymptomatic. Although colorectal cancer has a low ratio in Japan, the incidence rises for the Japanese living in Hawaii, and becomes equal to that of the Caucasians. Apparently, the chance of a patient developing colonic cancer is proportionate to the incidence of colonic cancer in the area in which he resides, rather than where he is born.

3222 ENTERIC INFECTION WITH Yersinia enterocolitica. LARGE PYRONINOPHILIC CELL REACTION IN MESENTERIC LYMPH NODES ASSOCIATED WITH EARLY PRODUCTION OF SPECIFIC ANTIBODIES. (E.) Ahlqvist, J. (Aurora Hosp., Helsinki, Finland), P. Ahvonen, J. A. Räsänen and G. R. Wallgren. *Acta Pathol. Microbiol. Scand.* [*A*] 79(2):109-122, 1971.

Enteric infection with Yersinia enterocolitica was usually associated with a macroscopically normal but microscopically focally ulcerated appendix and sometimes with pronounced proliferation of large pyroninophilic cells without reticulocytic abscesses in the mesenteric lymph nodes. Larger series should be studied with regard to a possible relationship between IgA levels and the mesenteric lymphadenitis. It was not known whether the lymph node reaction was related to the arthritis and erythema nodosum described in association with Y. enterocolitica infection. Tabulated data did not show any clear relationship between alterations in the appendix and those in the mesenteric lymph nodes nor between alterations in the appendix and serological findings like increased X. enterocolitica agglutinins, IgA and IgM antibodies. The immunological significance of the large pyroninophilic cell reaction is unknown.

3223 FATAL JUVENILE POLYPOSIS IN INFANCY. (E.) Soper, R. T. (U. Iowa Med. Ctr., Iowa City) and T. H. Kent. *Surgery* 69(5):692-698, 1971.

Five cases of fatal juvenile polyposis are summarized and a sixth is briefly reported. In all, anemia, anasarca and malabsorption accompanied bouts of bloody diarrhea and protein-wasting enteropathy. The most grave early complications were intussusception and rectal prolapse. Total parenteral hyperalimentation should precede polypectomy and colectomy. Intestinal continuity should be accomplished by endorectal pull-through.

3224 SURGICAL TREATMENT OF DIVERTICULITIS. (E.) Byrne, J. J. (Boston U. Surg. Serv., Mass.) and E. I. Garick. *Am. J. Surg.* 121(4):379-384, 1971.

The results of surgery on 106 patients with diverticulitis with various complications, and the results of various operations used in the treatment of chronic diverticular disease are reported. Of the 43 patients suffering from chronic disease, 1 of 6 died after transverse colostomy, 2 of 23 died after a 3-stage procedure, 1 of 1 died following cecostomy and resection, 0 of 6 died after transverse colostomy and resection, and 1 of 7 died after primary resection. Of the 6 patients operated upon for hemorrhage, 1 died (16%), while 3 of 14 operated on for obstruction died after surgery (21%). Of 43 patients who had perforated colons, 4 of 15 (26%) with peritonitis and 11 of 28 (39%) with abscess formation died following surgery. The overall mortality rate for all patients was 22%. Perforated lesions associated with peritonitis or abscess formation proved to be the most problematic regarding surgical treatment.

3225 A CONTROLLED TRIAL OF INVERTING VERSUS EVERTING INTESTINAL SUTURE IN CLINICAL LARGE-BOWEL SURGERY. (E.) Goligher, J. C. (Gen. Infirm., Leeds, England), C. Morris, W. A. F. McAdam, F. T. de Dombal and D. Johnston. *Br. J. Surg.* 57(11):817-822, 1970.

The effectiveness of a single-layer everting suture and a 2-layer inverting suture in large bowel surgery were compared with regard to operative mortality, wound infection rate, occurrence of fecal fistulas, and success of anastomosis. One patient died in the inverting group (2.9%) of suture line dehiscence, wound sepsis, peritonitis and chest infection; while 3 patients died in the everting group (8.9%), all of peritonitis. Infection was more common after everting suture (51%) than inverting (37%), although the difference was not statistically significant. The number of fecal fistulas was much higher after everting than inverting suture (43 vs 8.6%). Sigmoidoscopic and radiological examination revealed 7 partial dehiscences after inverting suture and 2 after everting suture. A tight fibrous stenosis developed at the anastomotic site in 2 of the 20 patients who had an everting suture but in none of the 16 who had inverting suture after left-sided colonic resection. An everting technique of suture in the large intestine is seemingly less desirable than an inverting technique.

3226 HIRSCHSPRUNG'S DISEASE. PROBLEMS IN THE ROENTGEN INTERPRETATION. (E.) Schey, W. L. (Michael Reese Hosp. Med. Ctr., Chicago, Ill.) and H. White. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):105-115, 1971.

The roentgenologic diagnosis of Hirschsprung's disease is sometimes difficult, especially in the neonate and infant. Anorectal narrowing and/or spasm should strongly suggest, but is not pathognomonic of, aganglionosis. The meconium plug syndrome may be the earliest manifestation of a patient with Hirschsprung's disease and may mask it entirely. The tapered anorectum, as noted on the barium enema examination, may mimic Hirschsprung's disease, whereas the patient with true short segment aganglionosis may demonstrate no aganglionic zone barium enema study and be labeled a psychogenic problem. Adequate biopsy including rectal myomectomy, in patients with suspicious aganglionosis is necessary for complete evaluation. It may be therapeutic in both cases of short segment aganglionosis and psychogenic megacolon.

3227 TRANSIT TIME RELATED TO CLINICAL FINDINGS IN CHILDREN WITH RECURRENT ABDOMINAL PAIN. (E.) Dimson, S. B. (Sydenham Child. Hosp., London). *Pediatrics* 47(4):666-674, 1971.

Rectal constipation was present in 66 (22%) children with migraine and recurrent abdominal pain. The transit time for a carmine marker was delayed in 91% of the above patients. In patients with migraine without abdominal pain, delayed transit was found in only 27% of cases, possibly accounted for mostly by colonic constipation, but delay is almost doubled in incidence and severity if abdominal pain supervenes with colonic tenderness. In most children colonic spasm rather than rectal constipation was responsible for attacks of abdominal pain. Transit time was prolonged in 44% and the colon was tender in 45% of cases. Colonic tenderness was associated more often with migraine and with a greater incidence and severity of intestinal delay than when colonic tenderness was absent. Recurrent abdominal pain of childhood is due most frequently to colonic spasm in children affected by autonomic imbalance. Although similar in many respects to adult spastic colon, these 2 conditions cannot be regarded as identical.

3228 ROENTGENOLOGIC AND CLINICAL MANIFESTATIONS OF NEONATAL NECROTIZING ENTEROCOLITIS. EXPERIENCE WITH 43 CASES. (E.) Bell, R. S. (U. Washington Affil. Hosps., Seattle),

C. B. Graham and J. K. Stevenson. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):123-134, 1971.

Medical records and roentgenograms of 43 infants who had a surgical, pathological, and/or roentgenologic diagnosis of neonatal necrotizing enterocolitis (NEC) over an 8-yr period were reviewed. The most common symptoms were gastric retention, abdominal distention, unstable temperature, lethargy and guaiac positive stools most frequently starting between the second and fifth days postpartum. The most distinctive radiographic feature of NEC was pneumatosis intestinalis which was found in 98% of the cases. Other roentgenographic findings included nonspecific bowel distention (53%), hepatic portal venous gas (30%), and pneumoperitoneum (14%). NEC was treated by surgery (52%), wide-spectrum antibiotics, and i.v. fluids and nasogastric suction when appropriate. The overall mortality for this group was 37%, the overall impression being that if the patient could survive the 5 days following diagnosis, the prognosis was excellent. Although the etiology of NEC is unknown, a mechanism of bowel ischemia as a result of infant stress leads to tissue damage and secondary bacterial invasion has been postulated.

3229 LIVER DISEASE IN CROHN'S COLITIS. A STUDY OF 21 CONSECUTIVE PATIENTS HAVING COLECTOMY. (E.) Eade, M. N. (Auckland U. Dept. Physiol., New Zealand), W. T. Cooke, B. N. Brooke and H. Thompson. *Ann. Intern. Med.* 74(4): 518-528, 1971.

Hepatic abnormalities were studied in 21 patients undergoing colectomy for Crohn's disease of the colon at the time of surgery and again 3-7 yr later. Following colectomy there was a high incidence of recurrent Crohn's disease in the small bowel, regardless of initial small bowel involvement. Abnormalities of liver histology were seen in 90% of the 20 operative biopsies, with 75% having more than mere minor changes. Cirrhosis, amyloidosis, and multiple hepatic granuloma were also present. Elevated serum alkaline phosphatase was useful in detection of significant hepatic abnormality while other tests were not especially useful, being either too insensitive (serum bilirubin and transaminases) or too nonspecific (serum protein abnormalities and sulfobromophthalien retention). Blood transfusions, potentially hepatotoxic drugs, and previous episodic hepatitis appeared unrelated to the observed liver abnormalities. These abnormalities found in Crohn's colitis are similar to those in ulcerative colitis and Crohn's disease of the small bowel.

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3282 COLIC COMPLICATION OF A PARAVERTEBRAL AORTOGRAPHY. (Fr.) Ponthieu, A. (CHU. Nord Hosp., Marseille, France) and J. F. Huguet. *Marseille Chir.* 22(2):228-239, 1970.

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3284 THE PRESENCE OF BOTH APPENDICITIS AND DIVERTICULITIS. (Hun.) Szabolcsi, T. *Magy. Sebesz.* 23(5):303-305, 1970.

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ULCERATIVE COLITIS

85 INTRACELLULAR POTASSIUM IN DIFFUSE PROCTOCOLITIS. (E.) Lockwood, C. M. niv. Coll. Hosp. Med. Sch., London), J. Harris d C. G. Clark. *Lancet* 1(7705):889-891, 1971.

comparison was made between specimens of colon tained from 6 patients undergoing panprocto- lectomy for diffuse ulcerative colitis and 11 tients treated for cancer of the large bowel. surgery, all were in fairly good health and fluid and electrolyte balance. The mean level intestinal mucosa intracellular potassium in tients with ulcerative colitis (180 μEq/g dry ssue) was significantly less than that in bowel ncer patients (276 μEq/g). Mean level of tracellular potassium from muscle cells were milar in the 2 groups, ruling out systemic pokalemia as a possible cause of the observed sults in the colitic mucosa. When immersed in nger's solution, normal mucosa depleted of tassium regained its normal potassium content thin 2 hr, while this was not observed in litic mucosa which continued to lose potassium en while immersed in this medium.

86 IDIOPATHIC PROCTOCOLITIS WITH COMMENTS ON THE DISEASE PATTERN IN MADRAS. (E.) danagopalan, N. (Madras Med. Coll., India). *dian Practit.* 24(1):57-63, 1971.

iopathic ulcerative proctocolitis is an illness unknown origin characterized by episodic arrhea with blood and mucus usually intimately xed with feces with presence of gross ulceration. e sigmoidoscopic appearance is usually that of ffuse inflammation of mucosa, hyperemia, techial hemorrhage and flare out on minimal auma, ulcerations and/or abscesses. The only finitive way of diagnosing amebic dysentery om colitis of unknown etiology is the demon- ration of erythrophagocytic pathogenic tamoeba histolytica in a swab. Local complica- ons of chronic colitis are colonic perforation, ssive hemorrhage, carcinoma, stricture, lyposis and fistula formation. Roentgenographic ndings generally serve to differentiate cases idiopathic, chronic ulcerative colitis from iopathic granulomatous colitis. Treatment involves correction of anemia, hypoalbuminemia, hypokalemia, hyponatremia, and vitamin deficiency state. Therapeutic drugs include systemic corticosteroids, hydrocortisone retention enemas and salicylazosulphapyridine.

3287 CHRONIC REGIONAL ENTEROCOLITIS (MB CROHN) IN CHILDREN AND ADOLESCENTS. (E.) Ehrenpreis, T. (Karolinska Hosp., Stockholm, Sweden), J. Gierup and R. Lagercrantz. *Acta Paediatr. Scand.* 60(2):209-215, 1971.

A series of 36 children and adolescents (24 male, 12 female) with chronic regional enterocolitis treated over a 10-yr period is presented. In 13 patients, 2 yr elapsed from the time of initial symptoms to the establishment of the diagnosis; in 7 patients, 4 yr elapsed. Nonspecific symptoms (fatigue, loss of appetite, weight-loss, growth retardation) were the most common presenting symptoms, with abdominal pain and diarrhea the most common local presenting symptoms. Nine patients had perianal fistula and/or abscess formation; 7 had extraintestinal manifestations (arthritis, erythema nodosum, liver damage); 4 had palpable intra-abdominal masses and 2 had intra-abdominal fistulizations. The results of conservative management were poor. The majority (31 patients) were subjected to surgical procedures, the main indication being chronic, progressive disease. The immediate results of surgery were good; however, a recurrence rate of 50% was encountered in late evaluation. Extensive disease, especially when treated with resection and ileo-rectal anastomosis seemed to have an unfavorable prognosis.

3288 THE COMPLICATIONS OF ENTEROCOLITIS. (E.) Latchis, K. S., C. S. Rao and B. P. Colcock (Lahey Clin. Found., Boston, Mass.). *Am. J. Surg.* 121(4):418-425, 1971.

One hundred and seventeen patients operated on for enterocolitis at the Lahey Clinic from 1963-1969 are reviewed. Resection was the procedure of choice and was associated with a mortality rate of 2.6%. In 8 patients (6.8%)

who had only 2-4 feet of small bowel remaining, the short bowel syndrome developed. Recurrent disease neccessitated reoperation in 23% of all patients. The reoperation rate for 272 patients operated on prior to 1958 is now 26.8%, representing a follow-up period of 10-30 yr and nearly 50% of all patients requiring reoperation will have a good to excellent result up to 6 yr from the time of the initial operation. Only those patients with intractable symptoms, obstruction, or fistula should be operated upon.

3289 SERUM CONCENTRATION OF 19 SERUM PROTEINS IN CROHN'S DISEASE AND ULCERATIVE COLITIS. (E.) Weeke, B. (Natl. Hosp., Copenhagen, Denmark) and S. Jarnam. *Gut* 12(4):297-302, 1971.

Electrophoretic determination of the concentration of 19 serum proteins was studied in 42 patients with Crohn's disease and 36 patients with ulcerative colitis. Although distinct changes were present in these 2 diseases, no significant difference existed concerning the serum protein pattern. Orosomucoid, α_1-antitrypsin, α_1-antichymotrypsin and haptoglobin increased. Prealbumin, albumin, α_2-HS glycoprotein, and transferrin decreased. Easily precipitable glycoprotein, Gc protein, caeruloplasmin, α_2-macroglobulin, hemopexin and complement C'3 displayed only minor changes. Increasing severity in both diseases was associated with increasing serum levels of the acute phase reactants (orosomucoid, α_1-antitrypsin, α_1-antichymotrypsin, and haptoglobin). In ulcerative colitis high activity depressed IgG, IgA and IgM. The elevation of haptoglobin in 8 patients with Crohn's disease who had either an abscess or suppurative fistula was remarkedly high compared with the other acute phase reactants. The concentrations of certain proteins: the acute phase reactants and the immunoglobulins yield useful information about the grade of activity of the disease and may be of prognostic value.

3290 IMMUNOLOGICAL APPARATUS OF THE GUT AND INFLAMMATORY BOWEL DISEASE. (E.) Kraft, S. C. (U. Chicago Hosps., Ill.) and J. B. Kirsner. *Gastroenterology* 60(5):922-951, 1971.

Current concepts of the immunological apparatus of the normal gastrointestinal tract are emphasized and efforts to incriminate this apparatus in the etiology and pathogenesis of nonspecific ulcerative colitis and Crohn's disease was examined. Clinical and laboratory data suggesting the participation of immunological phenomena in ulcerative colitis are persuasive, and a spectrum of circulating reactants has been described in patients with this disease. There is no conclusive evidence that anticolon antibodies are of primary importance in the pathogenesis of either ulcerative colitis or Crohn's disease. The possible involvement of an immune process mediated by lymphocytes merits continued study in both ulcerative colitis and Crohn's disease, especially an assessment of biological activities and reactivities of lymphocyte populations isolated from intestinal tissue.

3291 ACUTE COLECTASIA IN ULCERO-HEMORRHAGIC RECTOCOLITIS. (Fr.) Monath, C. (CHU Med. Clin. A, Strasbourg, France), J.-P. Weill, H. Jeanmaire, F. Geisler and M. Weill-Bousson. *Arch. Fr. Mal. App. Dig.* 60(3):81-94, 1970.

3292 SURGICAL TREATMENT OF ULCERATIVE COLITIS AND CROHN'S DISEASE. (Ger.) Deucher, F. (Canton Hosp., Aarau, Switzerland), A. Widmer and R. Dippon. *Schweiz. Med. Wochenschr.* 101(20):707-716, 1971.

3293 CELLULAR HYPERSENSITIVITY IN ULCERATIVE COLITIS AND CROHN'S DISEASE. (Ger.) Bendixen, G. (Nat. Hosp., Copenhagen, Denmark). *Schweiz. Med. Wochenschr.* 101(20):698-701, 1971.

3294 THE MORPHOLOGIC DIFFERENTIAL DIAGNOSIS OF CHRONIC NON-SPECIFIC ULCERATIVE COLITIS. (Ger.) Gloor, F. (St. Gallen Canton Hosp., Switzerland). *Schweiz. Med. Wochenschr.* 101(20):690-697, 1971.

3295 HISTOPATHOLOGIC SPECTRUM OF REGIONAL ENTERITIS AND ULCERATIVE COLITIS. (E.) Mottet, N. K. Philadelphia, W. B. Saunders Co., 1971. 249 pp.

3296 AKLYLOSING SPONDYLITIS AND SPONDYLITIS ACCOMPANYING ULCERATIVE COLITIS, REGIONAL ENTERITIS, PSORIASIS AND REITER'S DISEASE. A COMPARATIVE STUDY. (E.) McEwen, C. (South Harpswell, Me.), D. DiTata, C. Lingg, A. Porini, A. Good and T. Rankin. *Arthritis Rheum.* 14(3):291-318, 1971.

3297 SURGICAL MANAGEMENT OF ENTEROCOLITIS. (E.) Colcock, B. P. *Surg. Clin. North Am.* 51(3):775-781, 1971.

3298 ULCERATIVE COLITIS. CLINICAL AND THERAPEUTIC ANALYSIS. (Sp.) Aguilar Reina, J. (City Social Security Sanitar., Seville, Spain), J. Carneado and F. Andréu Kern. *Rev. Esp. Enferm. Apar. Dig.* 33(6):665-666, 1971.

3299 A CASE OF NECROSING RECTOCOLITIS. POSSIBLE DIGESTIVE LOCALIZATION OF SHWARTZMAN SANARELLI SYNDROME. (Fr.) Bourreille, J. (CHU Serv. Geriat. Med., Rouen, France), J. Hemet, M. Segrestin and C. Duval. *Sem. Hop. Paris* 46(45):2962-2965, 1970.

3300 MORPHOLOGICAL CHANGES IN NONSPECIFIC ULCERATIVE COLITIS COMPLICATED BY INTESTINAL MICROBIAL CHANGES. (Rus.) Rizhkov, E. V. and V. N. Krasnogolovets. *Sov. Med.* 33(12): 62-68, 1970.

3301 THYMUS AND ULCERATIVE COLITIS. (Ger.) Schmid, K. O. (U. Graz Inst. Pathol. Anat., Austria). *Verh. Dtsch. Ges. Pathol.* 54:313-319, 1970.

3302 DIFFERENTIAL DIAGNOSIS OF SEGMENTAL ULCERATIVE DISEASES OF THE COLON. (Ger.) Hermanek, P. (Univ. Surg. Clin., Erlangen, Germany). *Verh. Dtsch. Ges. Pathol.* 54:381-385, 1970.

3303 X-RAY DIAGNOSIS OF ULCERATIVE COLITIS. (Ger.) Nagele, E. (U. Giessen Med. Clin., Germany) and O. Elbert. *Diagnostik* 4(2): 56-60, 1971.

See also number: 3182

3304 FAMILIAL HYPERLIPOPROTEINEMIA AND EXOCRINE PANCREAS. (E.) Herfort, K. (Charles U. 2nd Res. Div. Gastroenterol., Prague, Czechoslovakia), J. Šobra, P. Frič and A. Heyrovský. *Scand. J. Gastroenterol.* 6(2):139-143, 1971.

A group of 28 patients with familial hyperlipoproteinemia grouped according to Fredrickson's classification were investigated for possible exocrine pancreatic disturbances. A disturbance in the secretory capacity of the exocrine pancreas was observed in 75% of the patients, more often in patients with attacks of abdominal pain. The most frequent finding was a decreased lipase output, followed by decreased bicarbonate output, maximum bicarbonate concentration, amylase output and total volume. Three or more values were decreased in patients with types I, IV, and V hyperlipoproteinemia, but not in types II and III. Known changes in the lipid spectrum in patients with type I, IV or V may be only of the so far known genetic manifestations of inborn errors of lipid metabolism, another manifestation perhaps being a defect in the secretory apparatus of the exocrine pancreas which at a certain stage of the disease is displayed in the above described functional and morphological changes.

3305 PANCREATICODUODENECTOMY IN INFANCY: A CASE REPORT. (E.) Wright, E. S. (Mem. U. Newfoundland Dept. Surg., St. John's, Canada). *Surgery* 69(3):389-392, 1971.

A 16-month-old male infant was admitted with a 1-week history of diarrhea and vomiting and was seen to be malnourished and dehydrated and to have a large irregular mass in the right upper quadrant and epigastrium. Laparotomy revealed a large mobile tumor mass, apparently in the head of the pancreas and compressing the first 2 parts of the duodenum; no obvious hepatic metastases; markedly enlarged mesenteric nodes which showed reactive hyperplasia. At a second laparotomy 2 weeks later a full exploration was performed followed by pancreaticoduodenectomy. The resected specimen consisted of the pyloric antrum, duodenum, proximal jejunum, gallbladder, lower end of the common bile duct and the head and body of the pancreas. The transected surface of the pancreatic tail was invaginated into the open end of the jejunum, the common bile duct was implanted via a small stab incision into the lumen of the jejunum and an antecolic gastrojejunostomy (approximately 8 inches distal to the implanted common bile duct) completed the procedure. Microscopically the tumor (grossly 9 X 8 X 4 cm) was a myxoid variant of neurofibrosarcoma, fibrosarcoma of low-grade malignancy, and myxoid embryonal rhabdomyosarcoma. The postoperative course was uncomplicated and the patient was clinically free of any recurrence or pancreatic insufficiency 2 yr later.

3306 PANCREATIC ASCITES. (E.) Gunstone, R. F. (Makerere U. Med. Sch., Kampala, Uganda), R. Claxton, P. G. D'Arbela and S. K. Kajubi. *Br. Med. J.* 1(5748):536, 1971.

Examination of a 16-yr-old Rwandan boy, who had intermittent vomiting (1 month), swelling of the left leg (6 days), and abdominal pain and distensi (3 days), revealed gross ascites and left femoral vein thrombosis. The ascitic fluid was blood stained and reaccumulated within 24 hr following complete paracentesis. No neoplastic cells were present in ascitic fluid or bone marrow, liver function tests were normal and serum amylase was 291 Somogyi units/100 ml. Barium studies revealed a mass behind the stomach. The ascites responded poorly to diuretics and salt restrictior although venous thrombosis resolved. At laparotom a pseudopancreatic cyst about 15 cm in diameter was found displacing the stomach and transverse colon anteriorly, and was drained. Histological examination of the cyst wall showed granulation tissue. Postoperative progress was uneventful marked by the cessation of vomiting and ascites. A simple estimation of the ascitic fluid amylase (possible increase) would be helpful in the diagnosis of ascites of obscure origin.

3307 ECTOPIC PANCREAS. (Sp.) Spector, C. H., J. A. Ferreira, P. M. Ciesco and M. Meeroff. *Bol. Soc. Argent. Cir.* 31(16): 414-421, 1970.

3308 OVULATION INHIBITORS AND PANCREATIC DISEASE. (Ger.) Bauer Hack, K. (Duisbergweg 2, Ludenscheid, Germany). *Med. Welt* 21(40):1739-1745, 1970.

3309 HYPOGLYCEMIC ENCEPHALOPATHY CAUSED BY PANCREATIC TUMOR. (Fr.) Barbier, J. (CHU Serv. Clin. Surg., Poitiers, France), Y. Sudre and R. Gil. *Ouest Med.* 23(19):1549-1565, 1970.

3310 HEREDITARY PANCREATIC LITHIASIS. (Jap. Kitamura, T. (Adult Dis. Ctr., Osaka, Japan), N. Horiuchi, F. Nakagawa and H. Inui. *Nippon Naika Gakkai Zasshi (J. Jap. Soc. Intern. Med.)* 59(4):32-36, 1970.

3311 CYSTS OF THE PANCREAS AND THEIR TREATMENT. (Turk.) Akgun, S. (U. Ankara Dept. Med., Turkey), F. Uzer and S. Acarturk. *Tip Fak. Mecm.* 23(2):466-476, 1970.

3312 PANCREATIC TERATOMA IN A 2-YEAR-OLD GIRL. (Pol.) Bittner, K. (Inst. Pediatr., Poznan, Poland) and O. Sarrazin. *Wiad. Lek.* 23(14):1251-1252, 1970.

313 PARTIAL TEMPORARY ISCHEMIA IN THE FELINE PANCREAS. (Ger.) Schmitz oormann, P. (Univ. Pathol. Inst., Marburg/L., ermany), U. Zimmermann and E. Kreilos. *Verh. tsch. Ges. Pathol.* 54:376-381, 1970.

314 CONSERVATIVE TREATMENT OF CARCINOMA OF THE PANCREAS. (Ger.) Esch, W. Vienna - Lainz Hosp., Austria) and D. Latal. *cta Chir. Austria* 3(2):36-39, 1971.

315 THE INTESTINAL RADIOLOGICAL CHANGES IN OLDER PEOPLE WITH PANCREATIC CYSTIC IBROSIS. (E.) Bartram, C. I. (Westminster Hosp., ondon) and E. Small. *Br. J. Radiol.* 44(519): 95-197, 1971.

316 CARCINOMA OF THE PANCREAS, INFANTILE TYPE. A LIGHT AND ELECTRON MICROSCOPIC TUDY. (E.) Frable, W. J. (Med. Coll. Virginia, ichmond), W. J. S. Still and S. Kay. *Cancer* 7(3):667-673, 1971.

317 PANCREATIC CYST OF ATYPICAL LOCALIZATION. (Ger.) Nissen, H. H. (St. Gertrauden Hosp., Berlin). *Fortschr. Geb. Roentgenstr. Nuklearmed* 114(1):133, 1971.

3318 HEMORRHAGE FROM ABDOMINAL AORTA INTO THE INTESTINE DUE TO A PANCREATIC PSEUDOCYST. (Ger.) Marx, E. (U. Surg. Clin., Dusseldorf, Germany), V. Sadony and H. J. Sykosch. *Med. Welt* 21(49):2117-2121, 1970.

3319 DIAGNOSIS OF PANCREATIC DISEASE. (E.) Brom, B. (Univ. Sch. Med., Miami, Fla.) and M. H. Kalser. *J. Fla. Med. Assoc.* 58(2):29-31, 1971.

3320 RADIOGRAPHY OF THE DUCT OF WIRSUNG: INDICATIONS, RESULTS. (Sp.) Moroni, J. M. *Bol. Soc. Argent. Cir.* 31(17):437-446, 1970.

3321 ULTRASTRUCTURAL CHANGES OF THE PANCREAS OF RATS IN HEMORRHAGIC SHOCK. (Ger.) Donath, K. (U. Hamburg Inst. Pathol., Germany), H. Mitschke and G. Seifert. *Beitr. Pathol. Anat.* 141(1):33-51, 1970.

See also numbers: 2715, 2763, 2913, 2954, 2981, 3192

PANCREATITIS

322 PANCREATIC ASCITES: A RARE COMPLICATION OF PANCREATITIS IN CHILDHOOD. (E.) oupland, G. (Roy. North Shore Hosp., Sydney, ustralia). *Aust. NZ J. Surg.* 40(3):252-255, 1971.

Ascites is a rare complication of pancreatitis, and may pose a confusing clinical problem in childhood when it is the dominant sign of illness. A positive diagnosis of pancreatic ascites can be made by the estimation of the amylase content of the pancreatic fluid. In abdominal paracentesis the high amylase level in pancreatic ascites contrasts with the low levels seen in cirrhosis of the liver. Laparotomy and drainage of the pancreas is recommended if the child's condition deteriorates. This relieves the ascites and removes the irritating effect of the pancreatic enzymes in the peritoneal cavity. If pseudocyst formation occurs, as suggested by palpation, barium meal examination, and persistently elevated serum amylase levels, further laparotomy with internal drainage of the pseudocyst is recommended.

3323 A STUDY OF PANCREATIC ENZYMES AS A FACTOR IN THE PATHOGENESIS OF DISSEMINATED INTRAVASCULAR COAGULATION DURING ACUTE PANCREATITIS. (E.) Kwaan, H. C. (VA Res. Hosp., Chicago, Ill.), M. C. Anderson and L. Gramatica. *Surgery* 69(5):663-672, 1971.

Cases are briefly reported of 3 patients with acute pancreatitis who developed disseminated intravascular coagulation. In one this clinical picture followed consumption of large quantities of alcohol while in the other 2 it occurred during the immediate postpartum period. In experimental studies, dogs were infused i.v. with trypsin, pancreatic lipase and phospholipase A, while some also received infusions of trypsin into the pancreatic duct. Only the i.v. infusion of trypsin was followed by disseminated intravascular coagulation, as manifested by marked decreases in levels of thrombocytes, fibrinogen and in factors V and VIII and by a marked increase in the prothrombin time and in the level of plasminogen activator. Within 3 hr of infusion, microthrombi were detected in the lung.

3324 PANCREATITIS. A CLINICAL AND EXPERIMENTAL STUDY. (E.) Chhuttani, P. N. (Postgrad. Inst. Med. Ed. Res., Chandigarh, India), L. S. Chawla and G. Avasthi. *Indian Practit.* 24(1): 31-38, 1971.

In a series of 86 patients with various types of pancreatitis, symptoms varied with the severity of the disease. In the first 24-48 hr, pain was the major symptom; later nausea, vomiting, ileus and distension were more apparent. Elevated serum amylase and urinary diastase were highly suggestive of pancreatitis. A rise of lipase 2 to 3 times the normal value was indicative of acute pancreatitis. Tryptic activity measured in 38 patients was especially useful in diagnosing chronic pancreatitis and carcinoma of the pancreas where the activity was very low. Localized ileus, pancreatic calculi and calcification were rarely seen. Gallbladder disease was found in 52.2% of cases while a history of alcohol intake was found in 8.1%. Early surgical intervention (marsupialization of the cyst) is essential when pseudopancreatic cyst formation takes place. In chronic relapsing pancreatitis, sphincterotomy combined with cholecystectomy was the treatment of choice.

3325 PROBLEMS IN ACUTE PANCREATITIS. (E.) Kalliomäki, J. L. (U. Turku Dept. Med., Finland) and L. E. Antila. *J. Am. Geriat. Soc.* 19(6):517-525, 1971.

In a series of 132 hospitalized patients (43 men and 89 women) with acute pancreatitis, the overall mortality rate was 28%. Most of the patients who died had manifest heart failure and were > 60 yr of age. The duration of symptoms before hospital admission for males was significantly less (24 hr) than females (5 or more days). Many patients had only thoracic pain simulating an infarction but no abdominal pain. An important predisposing factor was any pathological change in the gallbladder or biliary duct system. Findings that may be important for the clinical evaluation are serum amylase levels, electrocardiographic findings (changes not attributable to a given cardiac defect e.g. ST segment depression), and thoracic radiographic findings. Treatment included corticosteroid therapy, carbonic-anhydrase inhibition, and antibiotics. Necrotic pancreatitis exhibiting a violent course nearly always leads rapidly to death, despite treatment.

3326 EXOCRINE PANCREATIC FUNCTION IN CALCIFIC PANCREATITIS IN INDIA. (E.) George, P. K., P. A. Banks (1101 Beacon St., Brookline, Mass.), K. N. Pai, M. Ramachandran, M. Thangavelu and B. N. Tandon. *Gastroenterology* 60(5): 858-863, 1971.

Exocrine pancreatic function was evaluated in 15 patients from southern India with calcific pancreatitis. Volume output among patients was significantly lower than controls following secretin administration. The patients as a group exhibited normal bicarbonate response. Concentrations of both protease and lipase were markedly reduced among patients during all collection periods. Amylase secretion was reduced during the basal period, after the administration of pancreozymin, and during the 20-min period following the injection of secretin; however, this impairment was less than that for protease and lipase. Calcific pancreatitis in Kerela, India seems to differ in many respects from the disease as reported elsewhere.

3327 HYPOTONIC DUODENOGRAPHY IN CHRONIC PANCREATITIS. (E.) Rubinstein, Z. J. (Groote Schuur Hosp., Cape Town, South Africa), S. Bank, I. N. Marks and C. Psillos. *Br. J. Radiol.* 44(518):142-149, 1971.

The radiological appearances and diagnostic accuracy of hypotonic duodenography (a technique whereby the duodenal loop is rendered flaccid and aperistaltic prior to it being distended with barium and air) in patients with proven chronic pancreatitis was assessed. Abnormal duodenograms were found in 80% of 40 patients examined, abnormalities occurring with equal frequency in patients with calcific and non-calcific pancreatitis. An irregular serrated or spiculated appearance of the duodenal outline, effacement of the adjacent mucosal folds and flattening of the duodenal wall were the major abnormalities found, the medial wall of the second part of the duodenum being predominantly affected. Extrinsic pressure on the duodenal contour was occasionally present, manifested by widening of the entire duodenal loop or nodular extrinsic impressions. Two patients revealed enlargement of the papilla of Vater. The greater accuracy and sensitivity of duodenography does not replace the conventional upper gastrointestinal barium examination, but as a more specialized technique performed subsequent to the barium exam, duodenography ensures that gastric and duodenal cap abnormalities as well as lesions confined to the body and tail of the pancreas, are not overlooked.

3328 ALCOHOLISM AND PANCREATITIS. ALCOHOLIC PANCREATITIS IN MAN. (Ger.) Sarles, H. (INSERM Res. Unit Dig. Pathol., Marseille, France). *Scand. J. Gastroenterol.* 6(3):193-198, 1971.

3329 COMPREHENSIVE MANAGEMENT OF CHRONIC RELAPSING PANCREATITIS. (E.) Warren, K. W. and J. C. Mountain. *Surg. Clin. North Am.* 51(3):693-710, 1971.

3330 SURGICAL TREATMENT OF CHRONIC PANCREATIC DISEASE. (Sp.) Artigas, V.

(Santa Cruz y San Pablo Hosp., Barcelona, Spain). *Prensa Med. Argent.* 57(27):1325-1331, 1970.

3331 THE PANCREAS AS A GLAND OF INTERNAL SECRETION IN THE COURSE OF CHRONIC PANCREATITIS. THE HISTOLOGY AND INTERRELATIONSHIP OF VARIOUS CELL TYPES. (Fr.) Potet, F. (Beaujon Hosp., Clichy, France), J. Barge and N. Duclert. *Arch. Anat. Pathol. (Paris)* 18(3):219-222, 1970.

3332 PARADOXES AND HYPOTHESES REGARDING ACUTE PANCREATITIS. (Fr.) Leger, L. (Cochin Hosp., Paris). *Bull. Acad. Natl. Med. (Paris)* 154(17-18):401-409, 1970.

3333 SURGICAL TREATMENT OF CHRONIC PANCREATITIS. (Sp.) Puestow, C. B. (VA Hosp., Hines, Ill.). *Prensa Med. Argent.* 57(27):1332-1334, 1970.

3334 ULTRASTRUCTURAL STUDY OF THE PRIMARY STAGES OF EXPERIMENTAL ACUTE PANCREATITIS. (Ger.) Pasquini, F. (U. Perugia Inst. Spec. Pathol. Surg., Italy), P. Gulla, O. Fagioli and A. Giordano. *Gazz. Int. Med. Chir.* 76(3):163-186, 1971.

3335 PANCREATITIS. (Fr.) Barbier, J. P. (Laennec Hosp., Paris). *Monogr. Med. Sci.* 22(137):1-64, 1970.

3336 PSEUDO ANEURYSMAL DISSECTION OF THE DUODENAL WALL DURING AN EPISODE OF PANCREATITIS. (Fr.) Warter, J. (CHU Med. Clin., Strasbourg, France), F. Kempf, A. Sibilly and J. C. Brechenmacher. *J. Radiol. Electrol. Med. Nucl.* 51(11):639-642, 1970.

3337 ACUTE PANCREATITIS WITH PORTAL HYPERTENSION (ACUTE PORTOPANCREATIC SYNDROME). (Rum.) Ghibu, M. (2nd Surg. Clin, Cluj, Rumania) and E. Lengyel. *Cluj. Med.* 43(2):357-363, 1970.

See also numbers: 3147, 3167

3338 ENCEPHALOPATHY AND FATTY DEGENERATION OF THE VISCERA IN NORTHEASTERN THAILAND. CLINICAL SYNDROME AND EPIDEMIOLOGY. (E.) Olson, L. C., C. H. Bourgeois, Jr., R. B. Cotton (SEATO Med. Project US Component, APO San Francisco, Calif.), S. Harikul, R. A. Grossman and T. J. Smith. *Pediatrics* 47(4):707-716, 1971.

Encephalopathy and fatty degeneration of the viscera was characterized by abrupt onset of central nervous system symptoms, with 70% of the patients pursuing a rapidly fatal course. The majority of patients had hyperglycemia, hyponatremia, hyperkalemia and elevated SGOT and/or SGPT levels. The disorder occurs throughout the year, but is most prevalent during the rainy season. Only children in a specific age group (1-6 yr) are affected and the disease shows a pronounced rural distribution. Thus, more than one factor is responsible in producing the full syndrome. Aflatoxin (produced by the fungus Aspergillus flavus) poisoning may be one of the etiologic factors responsible for the northeastern Thailand syndrome.

3339 MAJOR HEPATIC RESECTIONS IN INFANCY AND CHILDHOOD. (E.) Howat, J. M. (Hosp. Sick Child., London). *Gut* 12(3):212-217, 1971.

Hepatic lobectomy or segmental resection of the liver for various tumors (hepatoblastoma, nephroblastoma, hamartoma) was performed on 19 infants and children. Of the 10 cases, there were 6 deaths directly attributable to operation, a mortality of 31%. Four deaths occurred at operation, 3 from uncontrollable hemorrhage and one from hypovolemia. In the immediate postoperative period, one patient died from hypovolemia and one from bleeding. Only 3 of 14 patients with malignant tumors survived more than 1 yr. Apart from one operative death in an infant presenting with intraperitoneal hemorrhage, the patients with hamartomas were alive and well from 18 months to 5 yr after operation. Both patients who had preoperative radiotherapy showed a transient disturbance of liver function postoperatively and eventually died 2 months and 10 months, resp., after surgery.

3340 PHOSPHOLIPID FATTY LIVER: A PROPOSAL OF A NEW CONCEPT AND ITS ELECTRON MICROSCOPICAL STUDY. (E.) Shikata, T. (U. Tokyo Sch. Med.), T. Oda, C. Naito, T. Kanetaka and H. Suzuki. *Acta Pathol. Jap.* 20(4):467-486, 1970.

Three cases of phospholipid fatty liver are briefly presented. Needle biopsy specimens from all 3 patients revealed the presence of phospholipids in the hepatic parenchymal cells. All showed some chronic inflammation and enlarged hepatic parenchymal cells with very opaque cytoplasm. Electron microscopy revealed the cytoplasm of the hepatic parenchymal cells to be filled with innumerable myelin structures which were distributed throughout the cytoplasm, were almost circular and had concentric lamellar structures. Since these structures were partly enclosed by a single membrane together with smooth-surfaced endoplasmic reticulum, they were considered autophagic vacuoles. The myelin structures were partly adherent to mitochondria. In these patients, the hepatic phospholipid content was increased 2-fold over normal, of which lysolecithin was increased and lecithin slightly decreased; serum phospholipids were also increased with a relatively high concentratio of lysolecithin and a slight decrease of lecithin.

3341 HEPATIC GLYCOGEN STORAGE DISEASE. CLINICAL AND LABORATORY FINDINGS IN 23 CASES. (E.) Spencer-Peet, J. (U. London Inst. Child Health), M. E. Norman, B. D. Lake, J. McNamara and A. D. Patrick. *Q. J. Med.* 40(157): 95-145, 1971.

The clinical and laboratory findings in 23 children with proven glycogen storage disease are described in order to show the relative value of different laboratory investigations and the difficulties encountered in establishing a diagnosis. In 33% of the patients, no enzyme defect could be found. In these cases, tissue-specific enzyme activity studies enabled the avoidance of an incorrect diagnosis of enzyme deficiency. In the other 66% of the patients, excessive glycogen deposition was associated with a deficiency of glucose-6-phosphatase, amylo-1,6-glucosidase, or hepatic phosphorylase. The symptoms noted in infancy were irritability, pallor and cyanosis, insomnia, feeding difficultie and seizures, all of which were usually associated with hypoglycemia. During periods of acute metabolic disturbance, i.v. therapy was required for correction of hypoglycemia and/or acidosis in several of the more severely afflicted children. In most of the children blood sugar level was successfully managed by dietary regulation. Diazoxide was administered to 2 children who did not respond to dietary management

3342 EXTRACORPOREAL PIG-LIVER PERFUSION IN THE TREATMENT OF HEPATIC COMA DUE TO FULMINANT HEPATITIS. (E.) Parbhoo, S. P. (Roy. Free Hosp., London), J. Kennedy, I. M. James, L. J. Chalstrey, A. Ajdukiewicz, P. J. Brock, C. Xanalatos, P. Sayer and S. Sherlock. *Lancet* 1(7701):659-664, 1971.

Extracorporeal pig-liver perfusions were performed on 5 patients in acute liver failure and in deep hepatic coma due to fulminant hepatitis. All 5 patients showed lightening of coma with improvemen in the EEG grade and level of consciousness during liver perfusion. Hemorrhage from gastric and duodenal ulcers and esophageal varices, acute hemorrhagic pancreatitis, renal and respiratory failure, hypoglycemia, hypokalemia, hypocalcemia, and psychosis were complications observed during and after perfusion. Of the 5 patients, 3 died 2 hr to 10 days after the procedure while the other 2 are still alive after 13 and 8 months, resp.

3343 ERYTHROPOIETIN ALTERATIONS IN HUMAN LIVER DISEASE. (E.) Mirand, E. A. (Roswell Park Mem. Inst., Buffalo, N. Y.) and G. P. Murphy. *NY State J. Med.* 71(8):860-864, 1971.

Plasma and urine samples from 41 patients with liver disease were assayed for erythropoietin (ESF) levels. Patients with hepatocarcinoma were found to have elevated ESF levels in plasma, urine and liver extracts associated with erythocytosis. Patients with liver dysfunction associated with cystic disease, toxic damage, or infiltration secondary to other systemic illnesses exhibited elevated plasma and urine ESF levels which were not usually associated with elevated hematocrits. The elevation in plasma and urinary ESF in liver disease states may be due to the failure of the liver to inactivate ESF. Maintenance of elevated ESF levels in patients with hepatocarcinoma may occur via 1) production of ESF by the malignant cells, 2) increased storage of ESF by malignant cells, and/or 3) overproduction by tumor cells of a serum substrate that interacts with renal erythropoietic factor to produce functional ESF.

3344 ^{75}Se-SELENOMETHIONINE IN THE SCINTISCAN DIAGNOSIS OF PRIMARY HEPATOCELLULAR CARCINOMA. (E.) Eddleston, A. L. W. F. (King's Coll. Hosp., London), M. O. Rake, A. P. Pagaltsos, S. B. Osborn and R. Williams. *Gut* 12(2):245-249, 1971.

Of 48 patients demonstrating cold areas on ^{99m}Tc sulphur colloid liver scintiscans, 25 had cirrhosis, 9 had primary liver tumors, but in the other 16 no cause could be found for the cold area. All the patients with primary hepatocellular carcinoma showed uptake of ^{75}Se in the area of the tumor almost equal to that in the normal liver. Markedly increased uptake of ^{75}Se was only found in 1 other tumor type - secondary hepatic deposits of melanoma, its uptake being low in cholangiocellular carcinoma, Kupffer cell sarcoma, and secondary hepatic deposits. Since the histological appearance of a primary hepatocellular carcinoma may closely resemble normal liver tissue, it is expected that the concentration of ^{75}Se (greater than ^{99m}Tc) in hepatocellular carcinoma be similar to that in surrounding normal tissue. Hence, the finding of an increased ^{75}Se uptake relative to ^{99m}Tc in the area of a suspected tumor is suggestive evidence of a primary hepatocellular carcinoma, whether or not there is underlying cirrhosis.

3345 SERUM LIPOPROTEINS IN INFANTS WITH LIVER DISEASE. (E.) Leonard, R. F. (U. Melbourne Dept. Pediatr., Australia), J. M. Court and D. M. Danks. *Aust. Paediatr. J.* 7(1):3-11, 1971.

A spectrum of change in the lysoprotein patterns of children with liver disease was observed grading from normal α-lipoprotein levels, through retarded mobility and diminished levels and ultimately to absence of this fraction. Also an abnormal lipoprotein band was found in 6 patients, which had a mobility between pre-β-lipoproteins and alpha-lipoprotein. Obstruction of bile flow was related to the disappearance of α-lipoproteins, whereas the abnormal lipoprotein was not evident unless the serum cholesterol level was substantially raised. The 2 phenomena may occur independently of each other. Experiments covering the nature of the abnormal lipoprotein pattern in liver disease, while demonstrating some differences in the physical properties of the β-lipoprotein fraction, gave no indication that there is any physical aggregation of lipoproteins or any changes resulting directly from increased serum bile acid concentrations.

3346 MECHANISM OF CHOLESTASIS. 4. STRUCTURAL AND BIOCHEMICAL CHANGES IN THE LIVER AND SERUM IN RATS AFTER BILE DUCT LIGATION. (E.) Schaffner, F. (Mt. Sinai Sch. Med., New York, N. Y.), P. G. Bacchin, F. Hutterer, H. H. Scharnbeck, L. L. Sarkozi, H. Denk and H. Popper. *Gastroenterology* 60(5):888-897, 1971.

Hepatocellular microsomal protein per 100 g body weight remained essentially unchanged during the 4 days following bile duct ligation; however, the cytochrome P-450 content of the microsomal fraction decreased each day. Binding of substrate to cytochrome P-450 was possible until day 4, after which it could no longer occur. Bilirubin, SGOT, SGPT, alkaline phosphatase and cholesterol values all rose at some time following the ligation. Bile canaliculi, especially in the centrolobular zone, became progressively dilated, with loss of microvilli and Golgi zone enlargement. The smooth endoplasmic reticulum initially showed dilation and then appeared to hypertrophy. There was a relative increase in smooth endoplasmic reticulum in cholestatic rats. Also seen were increases in lysosomes, microbodies and cholesterol. Cholestasis from bile duct ligation progressively changes the function and structure of the microsomal biotransformation system in the liver. Late injurious effects of cholestasis may be due to bile salt accumulation; these salts by their detergent action decrease the function of the hypertrophic smooth endoplasmic reticulum.

3347 A STUDY OF THE POSTOPERATIVE COURSE AFTER HEPATIC LOBECTOMY. (E.)

Pinkerton, J. A. (Vanderbilt U. Sch. Med., Nashville, Tenn.), J. L. Sawyers and J. H. Foster. *Ann. Surg.* 173(5):800-811, 1971.

A detailed evaluation of the postoperative course of 31 patients who underwent complete or extended hepatic lobectomy is presented. Fifteen patients (49%) had no postoperative complications. Among the other 16 patients the major complications included infection, and pulmonary, gastrointestinal and hepatobiliary problems. Major complications were more frequent in the group of 21 patients in whom the biliary tract was decompressed with a T-tube or catheter. Fever in excess of 38.8° C occurred in all but 3 patients, and in 14 cases no clinical explanation could be found. The overall mortality rate was 23% (7 patients), being 9.5% in the 21 patients less than 30 yr of age and 50% in the 10 patients > 30 yr old.

3348 MAXIMUM HEPATO-PERICYSTECTOMY WITH ELIMINATION OF RESIDUAL CAVITY, IN THE TREATMENT OF HYDATID CYST OF THE LIVER. (E.)

Stoica, T. (Hosp. No. 1, Braila, Rumania). *Chir. Gastroenterol.* 5(1):57-62, 1971.

Whenever total cystectomy for hydatid cyst was not practical, maximum hepato-pericystectomy combined with complete obliteration of the residual cavity was performed. This procedure consists of as extensive removal as possible of the adventitia, without limitation to only the extrahepatic extension but removing as much hepatic paracystic tissue as possible, sometimes altered by compression, to allow closure of the residual cavity to the point of its annulment. The final aim consists of complete closure of this cavity by means of tight suture, its closure being made easier by introducing a combination of iodine tincture and sulphonamides causing the early formation of adhesions between residual walls. External drainage of the principal biliary duct is employed whenever the cystic cavities display large biliary orifices or are accompanied by dilatation of external biliary ducts. The time of recovery was markedly shortened (not exceeding 15 days after surgery) compared with conventional operations.

3349 ORTHOTOPIC LIVER TRANSPLANTATION IN THE PIG. (E.)

Lempinen, M. (Univ. Cent. Hosp., Helsinki, Finland), K. Salmenkivi and A. Sivula. *Acta Chir. Scand.* 137(3):265-270, 1971.

Three deaths resulted from technical errors following orthotopic liver transplantation in 20 pigs. An additional 7 pigs died within 24 hr after surgery due to hemorrhage, thrombosis or twisting of the suprahepatic vena cava. Among later deaths (7 between 2-28 days), only 1 showed distinct signs of rejection. Serum protein, bilirubin, alkaline phosphatase, SGOT and LDH values normalized during 1-2 weeks and subsequently remained normal in the 3 successful transplantation The longest survivors (6 and 10 months) were healthy and maintained normal growth. Both anatomically and functionally the pig is a highly suitable subject for liver transplantation and its liver possesses minimal immunological activity

3350 ONE-STAGE HEPATECTOMY IN THE DOG WITH RESTORATION OF THE VENA CAVA BY END-TO-END ANASTOMOSIS. (E.)

Alican, F. (U. Mississippi Med. Ctr., Jackson), M. Cayirli and V. Keith. *Surgery* 69(3):427-432, 1971.

A new technique for 1-stage hepatectomy with restoration of the vena cava by end-to-end anastomosis in the dog is described. The liver along with a segment of the inferior vena cava including the ostia of all the hepatic veins were removed, and the cut ends of the vena cava were pulled together and sutured. There were no operative deaths; however, all dogs died in hepatic coma, the survival time being between 12-25 hr. In 11 of the 12 dogs, no intraabdominal or intrapleural bleeding was noted at autopsy. No thrombosis was seen at the vascular anastomoses This method avoids the use of prostheses and eliminates the problems associated with preserving the continuity of the inferior vena cava.

3351 THE EXPERIMENTAL OBSTRUCTIVE JAUNDICE AND LIVER MICROSOMAL ENZYMES IN RATS. (E.)

Kaltiala, E. H. (U. Oulu Dept. Surg., Finland). *Ann. Chir. Gynaecol. Fenn.* 60(1): 43-48, 1971.

After 3 days of biliary obstruction (common bile duct ligation), all hepatic microsomal enzyme activity decreased significantly compared with that in sham-operated rats. Eleven days following ligation, the metabolism of pethidine, hexobarbita and chlorpromazine by liver microsomal enzymes was 41, 85 and 77%, resp., lower than that in sham-operated controls. In the jaundiced rats bile acids accumulated as the duration of biliary stasis became longer, and at autopsy the common bile duct was found to be markedly distended with bile to a diameter of 4-5 mm. These bile acids could destroy liver subcellular structures, as they do in vitro, and thus the fall in microsomal enzyme activity in obstructive jaundice would be primarily due to the destructive influence of bile retention.

3352 BIOCHEMICAL CHANGES OF THE LIPID IN BIOPSIED LIVERS OF PATIENTS WITH MALIGNANT NEOPLASTIC DISEASES. (E.)

Nakazawa, I. (Tohoku U. Sch. Med., Sendai, Japan) and S. Yamagata. *Tohoku J. Exp. Med.* 103(2):129-139, 1971.

Differences in lipid biochemistry between patients with malignant neoplastic (stomach, large ntestine, pancreas, liver, lymphoma, uterine nd ovarian cancer, etc.) and benign diseases hepatitis, cirrhosis, fatty liver, ulcer, holelithiasis, diabetes, etc.) were studied sing liver biopsies which were subjected to istologic examination and thin layer and gas iquid chromatography. Patients with benign eoplastic disease demonstrated an increase in ercentage of $C_{14:0}$, $C_{16:1}$, and $C_{18:1}$ and a ecrease in the percentage of $C_{18:0}$, $C_{18:2}$, $_{20:4}$, and $C_{22:5}$ fatty acids. In the malignant ases, there was an increase in the percentage f $C_{20:4}$, and a decrease in the percentage of $_{14:0}$ and $C_{18:1}$ fatty acids when compared with he control group. The amount of fatty acid omponents in the phospholipid (PL) fraction of ivers of patients with malignancies was higher han normal, while the fatty acid components in he triglyceride (TG) was lower than normal. he ratios of the fatty acid content of the PL raction to that of the TG were over 2.20 in 19 ut of 22 malignant cases, but were under 2.19 n 20 benign cases possibly making this index seful in the diagnosis of malignant neoplastic isease.

3353 A CYTOLOGICAL STUDY OF EXTRA- AND INTRAHEPATIC CHOLESTASIS IN THE RAT. (E.) Ekelund, P. (U. Helsinki 2nd Dept. Pathol., Finland). *Ann. Med. Exp. Biol. Fenn.* 49(1): 49-53, 1971.

Estrogen treatment and common bile duct ligation induced intra - and extrahepatic cholestasis in rats. Histological changes in the liver following estrogen induced cholestasis hepatic retention of bile with centrilobular accentuation, the occurrence of bile plugs, and occasionally, minimal signs of hepatocellular necrosis in areas of bile stasis. Also, increased alkaline phosphatase activity was demonstrable in the liver cells, bile canaliculi, and sinusoids. The accumulation of alkaline phosphatase postitive material in the bile canaliculi seemed to be due to increased excretion of alkaline phosphatase positive substances into the canalicular lumen, rather than to bile flow obstruction. In extrahepatic cholestasis canalicular dilation and increased canalicular alkaline phosphatase activity were both demonstrable 12 hr after bile duct ligation. The increased enzyme activity in this case appeared to be due to bile retention in the liver.

3354 HEPATIC δ-AMINOLAEVULINIC ACID SYNTHETASE IN AN ATTACK OF HEREDITARY COPROPORPHYRIA AND DURING REMISSION. (E.) McIntyre, N. (Roy. Free Hosp., London), A. J. G. Pearson, D. J. Allan, S. Craske, G. M. L. West, M. R. Moore, J. Paxton, A. D. Beattie and A. Goldberg. *Lancet* 1(7699):560-564, 1971.

Four cases of coproporphyria are briefly reported, 2 observed during an attack, 2 during remission. During the attack there were significant elevations of urinary δ-aminolevulinic acid and porphobilinogen, not seen during remission. Urinary levels of uroporphyrin and coproporphyrin were elevated during the attack and, to a lesser extent, during remission. Fecal levels were elevated 64-243 times in both states, while fecal levels of protoporphyrin were within normal limits. Activity of hepatic δ-aminolevulinic acid synthetase were normal in 1 patient in remission and elevated 47-fold in one during an attack; levels were not measured in the other 2 cases. Activity of blood δ-aminolevulin acid dehydrase was below normal to mid-normal during remission and 1.5-2.5 times mid-normal during attack. Levels of urinary dehydroepiandrosterone and epiandrosterone were normal except for a 2-fold increase in the mean level of the latter agent in a 47-yr-old male in remission. Urinary levels of 11-hydroxyetiocholanone were normal in one in each phase and were markedly elevated (24 times normal mean) in a female during attack and were zero in a female in remission. Levels of 11-oxyandrosterone were elevated 6-fold in a female during the attack and decreased (60% of normal mean) in the single male in remission.

3355 TRANSIENT MACROAMYLASEMIA DURING AN EXACERBATION OF ACUTE INTERMITTENT PORPHYRIA. (E.) Hedger, R. W. and W. G. M. Gardison (Presbyterian-St. Luke's Hosp., Chicago, Ill.). *Gastroenterology* 60(5):903-908, 1971.

Sera from 4 patients with normal serum amylase activity, 3 patients with acute pancreatitis and the serum from a 21-year-old Negro female with acute intermittent porphyria were compared by an electrophoretic method. All sera except the porphyric patient's showed only on fraction of amylase activity confined to the α-globulin region. The porphyric patient's serum showed 2 fractions with amylase activity, one in the α_1-globulin region and an abnormal high (greater than 100,000) molecular weight fraction just preceding the γ-globulin region. Also, on gel filtration this patient's serum had 2 distinct peaks of amylase activity. The macroamylase disappeared from the serum following remission of symptoms of acute intermittent porphyria. Staining a gelatinized cellulose acetate serum electrophoresis strip for amylase seems a convenient method for the detection of more than 1 class of amylase.

3356 PROGRESS IN LIVER TRANSPLANTATION FOR BILIARY ATRESIA. (E.) Fonkalsrud, E. W. (UCLA Sch. Med., Los Angeles, Calif.), S. Draz and G. H. Stevens. *Am. Surg.* 37(7):389-392, 1971.

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3400 RADIOISOTOPE DIAGNOSTICS AND BIOCHEMICAL PARAMETERS IN DIFFUSE DISORDERS OF THE LIVER PARENCHYMA. (Ger.) Deininger, H. K. (Katharine Hosp., Stuttgart, Germany) and F. Heuck. *Roentgenblatter* 24(3):125-132, 1971.

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3404 A NEW BIOCHEMICAL ASPECT FOR TREATMENT OF THE LIVER. (Ger.) Gabler, H. (Schinnrainstr. 3b, Karlsruhe, Germany). *Ther. Ggw.* 110(4):505-514, 1971.

See also numbers: 2943, 2976, 2982, 3229

ACUTE NONVIRAL HEPATITIS AND HEPATIC INJURY

3405 PREDNISOLONE-INDUCED HEPATIC INJURY. ULTRASTRUCTURAL AND BIOCHEMICAL CHANGES IN RABBITS. (E.) Bhagwat, A. G. (St. Michael's Hosp., Toronto, Ontario, Canada) and R. C. Ross. *Arch. Pathol.* 91(6):483-492, 1971.

The effect of a single i.m. injection of prednisolone acetate (6.25 mg) on hepatic ultrastructure and liver function tests was studied in fasting and fed female rabbits. In fed animals, the injection caused a progressive increase in liver size and weight, however, in completely fasted animals the increase in liver weight occurred much more slowly. In both cases, a peak was reached at approximately 72 hr. Prednisolone treatment caused a marked ballooning of hepatocytes which corresponded with massive glycogen accumulation, swelling and pallor of mitochondria, proliferation of smooth endoplasmic reticulum, focal dilatations of rough endoplasmic reticulum, and swelling of bile canalicular microvilli. SGOT and alkaline phosphatase levels were unaffected by the prednisolone injection, while BSP retention was increased up to 72 hr in completely fasted, prednisolone-treated animals.

3406 DYNAMICS OF INJURY AND REPAIR IN HEPATIC CELLS. II. ASSOCIATION OF MEMBRANES WITH LIPID DURING RECOVERY FROM ETHIONINE-INDUCED FATTY LIVER. (E.) Shinozuka, H. (Temple U. Fels Res. Inst., Philadelphia, Pa.), B. Lombardi and E. Farber. *Am. J. Pathol.* 63(1): 161-180, 1971.

Injury by ethionine and repair of rat hepatic cells following a commercial pellet diet was investigated. The hepatic triglyceride levels, which had increased 10-fold following ethionine, gradually decreased after 2, 3 and 4 days of refeeding. Following ethionine injection, although nucleolar structure had returned to normal, the cytoplasm of almost all cells was disorganized. There were numerous lipid droplets of varying sizes (diameter 4-5 μ). Parallel arrays of rough endoplasmic reticulum and ribosomes were practically absent. There were many concentric lamellar bodies consisting of layers of smooth membranes. No changes were noted at 1 day of refeeding, however at days 2 and 3, the number and size of lipid droplets were reduced. Smooth vesicular membranes were increased in number and frequently surrounded lipid droplets. The Golgi apparatus became active particularly at day 3. Their cisternae were filled with osmiophilic material and they had many secretory vacuoles containing smaller osmiophilic droplets. By day 5 of refeeding, no lipid droplets were detected in many cells. The number of smooth membrane vesicles was reduced and stacks of parallel arrays of rough endoplasmic reticulum were observed. The recovery of the fatty liver apparently results from a breakdown of lipid droplets in intimate association with smooth membrane, and subsequent secretion of the lipid lipoproteins through the endoplasmic reticulum - Golgi system into the sinusoids.

3407 CORTICOSTEROID THERAPY IN SEVERE ALCOHOLIC HEPATITIS. A DOUBLE-BLIND DRUG TRIAL. (E.) Porter, H. P., F. R. Simon, C. E. Pope, II, W. Volwiler and L. F. Fenster (Mason Clin., Seattle, Wash.). *N. Engl. J. Med.* 284(24):1350-1355, 1971.

Although 45% of 20 corticosteroid-treated alcoholic hepatitis patients survived, (compared to only 22% survival in controls) this difference was not statistically significant. The use of high doses of glucocorticoids was not associated with a statistically significant increase in gastrointestinal ulcerations, systemic infections or psychologic alterations. Although the classic histology of alcoholic hepatitis is unlikely to be confused with that of viral hepatitis, the histologic findings of the latter conceivably could be altered considerably when superimposed on a fatty or cirrhotic liver. Thus, the possibility that the acute hepatic insufficiency seen in chronic alcoholism represents a superimposed viral hepatitis has been difficult to exclude on morphologic grounds alone. However, no hepatitis-associated antigen or antibody was found in any of the 16 patients so tested. Alcoholic hepatitis apparently does not represent long-standing viral hepatitis in alcoholics.

3408 THE INFLUENCE OF POSTNECROTIC CIRRHOSIS ON AFLATOXIN CARCINOGENESIS IN RATS. (E.) Sun, S.-C. (Veterans Gen. Hosp., Taipei, Taiwan), R.-D. Wei and B. T. Schaeffer. *Lab. Invest.* 24(5):368-372, 1971.

The effect of postnecrotic cirrhosis induced by CCl_4 on aflatoxin carcinogenesis was studied in rats using small i.p. doses of these toxins. Hepatocellular carcinoma and advanced atypia in hepatocytes were caused by the injection of aflatoxins B_1 and G_1 to rats with CCl4- induced postnecrotic cirrhosis. Within 12 weeks, 11 of 16 animals with moderate to severe cirrhosis injected with aflatoxins (600 µg) in 3 weekly doses developed hepatoma. No hepatic tumors were observed when the same dosage of aflatoxins was injected into animals with ethanol-induced fatty livers. When 1.6 mg aflatoxins were administered in 8 equal weekly doses, 65% (13 of 20) of the animals died within 37 weeks from hepatocarcinoma, parenchymal liver necrosis, or pulmonary infection. Livers of control animals without pretreatment with either CCl_4 or ethanol did not develop liver cancer following the administration of aflatoxin. Regenerative liver cells in cirrhotic nodules are seemingly more susceptible to aflatoxins than normal hepatic cells.

3409 ULTRASTRUCTURAL CHANGES INDUCED IN THE LIVER OF RATS BY VARIOUS STEROID COMPOUNDS. (E.) Horvath, E., K. Kovacs (U. Montreal Inst. Med., Quebec, Canada), J. A. Blascheck and A. Somogyi. *Virchows Arch. [Zellpathol.]* 7(4):348-355, 1971.

The effect of resistance-increasing steroids and other compounds inert in this respect on liver ultrastructure was studied in 36 female rats. The livers of animals treated with prednisolone and triamcinolone exhibited vacuolation, cytoplasmic lipid and glycogen accumulation and slightly pyknotic nuclei in the periportal regions when observed with a light microscope. SC-11927, ethylestrenol and hydroxydione caused a marked increase in the amount of smooth endoplasmic reticulum (SER). Oxandiolone resulted in a similar but less pronounced effect on the SER, and a dilation of the rough ER which was directly connected to smooth surfaced profiles and contained fewer ribosomes than normal. Testosterone, progesterone, estradiol and stilbestrol caused only minor alterations in RER and SER. The ultrastructure and amount of RER and SER in most of the DOC-treated animals corresponded to that of controls. SC-11927, prednisolone, DOC, triamcinolone and oxandrolone produced various mitochondrial alterations in hepatocytes.

3410 CHANGES IN THE ACTIVITIES OF LYSOSOMAL PROTEOLYTIC ENZYMES IN RAT LIVER DURING GALACTOSAMINE HEPATITIS: CATHEPSIN D, CATHEPSIN A, AND ACID CARBOXYPEPTIDASE. (Ger.) Stein, U. (Univ. Med. Clin., Freiburg i. Br., Germany), H. Heissmeyer, G. Wangemann, R. Lesch, W. Reutter and D. Keppler. *Klin. Wochenschr.* 49(9):550-554, 1971.

3411 INDUCTION OF HEPATIC MICROSOMAL HYDROXYLATING ENZYMES BY TECHNICAL PIPERONYL BUTOXIDE AND SOME OF ITS ANALOGS. (E.) Wagstaff, D. J. (U. Missouri Sch. Vet. Med., Columbia) and C. R. Short. *Toxicol. Appl. Pharmacol.* 19(1):54-61, 1971.

3412 BIOCHEMICAL AND PATHOLOGICAL CHANGES IN THE HEART AND LIVER OF RATS GIVEN BROMINATED COTTONSEED OIL. (E.) Munro, I. C. (Food and Drug Directorate Res. Labs., Ottawa, Canada), F. A. Salem, T. Goodman and S. H. Hasnain. *Toxicol. Appl. Pharmacol.* 19(1):62-70, 1971.

3413 ASCORBIC ACID DEFICIENCY AND INDUCTION OF HEPATIC MICROSOMAL HYDROXYLATIVE ENZYMES BY ORGANOCHLORINE PESTICIDES. (E.) Wagstaff, D. J. (U. Missouri Sch. Vet. Med., Columbia) and J. C. Street. *Toxicol. Appl. Pharmacol.* 19(1):10-19, 1971.

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3415 ELECTRON MICROSCOPIC OBSERVATIONS ON THE ACTIVATION OF KUPFFER CELLS BY DAMAGED LIVER PARENCHYMA. (Ger.) Pfeifer, U. (Univ. Wurzburg Inst. Pathol., Germany). *Verh. Dtsch. Ges. Pathol.* 54:513-518, 1970.

3416 CHRONIC ALCOHOLISM: RELATION BETWEEN LIVER DAMAGE AND CEREBRAL FUNCTION. (Ger.) Grunberger, J. (U. Vienna Neurol. Psychiatr. Clin., Austria), K. Irsigler and K. Kryspin Exner. *Wien. Z. Nervenheilkd.* 28(4):235-245, 1970.

3417 ENZYME HISTOCHEMISTRY OF THE EFFECT OF ETHANOL IN THE RAT LIVER. (Ger.) Goslar, H. G. (U. Bonn Inst. Anat., Germany), H. H. Berres and K. H. Jaeger. *Acta Histochem. (Jena)* Suppl. 9:501-503, 1971.

3418 THE ANTITOXIC EFFECTS OF B PYRIDYL CARBINOL AND NICOTINIC ACID IN THE RAT LIVER DAMAGED BY CCl_4. (Ger.) Hummler, H. (Hoffmann La-Roche & Co. Dept. Exp. Med., Basel, Switzerland). *Arzneim. Forsch.* 21(3):360-362, 1971.

3419 ENZYMOLOGIC AND HISTOLOGIC OBSERVATIONS ON LIVER DAMAGE IN EXPERIMENTAL ACETATE INTOXICATION. (It.) Querci, V. (Univ. Inst. Legal Med., Siena, Italy) and D. Mascia. *Med. Lav.* 61(10):524-530, 1970.

ACUTE VIRAL HEPATITIS

3420 AUSTRALIA ANTIGEN AND VIRAL HEPATITIS IN DRUG ABUSERS. (E.) Sutnick, A. I. (Inst. Cancer Res., Philadelphia, Pa.), J. J. Cerda, P. P. Toskes, W. T. London and B. S. Blumberg. *Arch. Intern. Med.* 127(5):939-941, 1971.

Australia antigen was found in the sera of 30 of 43 drug abusers with hepatitis, a similar frequency to posttransfusion hepatitis, but twice as high as the frequency in patients with infectious hepatitis. Liver biopsies of the drug abusers with hepatitis and the hepatitis patients did not reveal any differences. The high frequency of Australia antigen, not seen in toxic hepatitis, in drug abusers with hepatitis, favors a viral rather than a toxic etiology of hepatitis in these patients. Because of the known tendency of drug users to become professional blood donors to support their habit, the current study emphasizes the hazard of the use of sources of blood obtained from poorly screened donors.

3421 PLASMA LECITHIN: CHOLESTEROL ACYL-TRANSFERASE ACTIVITY IN ACUTE HEPATITIS. (E.) Gjone, E. (Univ. Hosp., Oslo, Norway), J. P. Blomhoff and I. Wiencke. *Scand. J. Gastroenterol.* 6(2):161-168, 1971.

Plasma lecithin:cholesterol acyl transferase (LCAT) activity was studied in 10 patients with acute parenchymatous hepatic diseases. Patients with severe liver failure exhibited significant reductions in LCAT levels which increased as their clinical signs improved. The observed reduced amounts of cholesterol esters in the patients with acute hepatitis and the low esterification in plasma, which occur rapidly with liver cell damage, seem to be a reflection of the low LCAT activity. The low LCAT activity demonstrated in acute hepatitis may also explain the occurrence of target cells in this disease. Plasma LCAT seemingly has a hepatocellular origin, its activity being dependent upon liver parenchymal function.

3422 ACQUISITION OF HEPATITIS-ASSOCIATED ANTIGEN. CLINICAL FEATURES IN YOUNG ADULTS. (E.) Barker, L. F. and R. Murray (NIH, Bethesda, Md.). *JAMA* 216(12):1970-1976, 1971.

Twelve adults who were followed up prospectively after inoculation with icterogenic materials developed serum hepatitis-associated antigen persistence. Each of these individuals still had the antigen in his serum when last tested, from 6 months to 3 yr after inoculation. Although these 12 had either unrecognized or very mild illness, 10 had some abnormal hepatic dysfunction. In comparison, the majority of 103 individuals who developed transient serum hepatitis-associated antigen in the same studies experienced more severe clinical episodes of hepatitis. On follow up examination of 72 such subjects in whose sera, antigen was no longer detectable after the acute illness, 16 had evidence of residual hepatic dysfunction. Apparently, many individuals who are carriers of hepatitis-associated antigen have chronic hepatitis, which has been noted in the past to follow anicteric as well as probable subclinical infections.

3423 PLEURAL EFFUSION ASSOCIATED WITH VIRAL HEPATITIS. (E.) Gross, P. A. (Yale U. Sch. Med., New Haven, Conn.) and D. N. Gerding. *Gastroenterology* 60(5):898-902, 1971.

A diagnosis of viral hepatitis was made in a young icteric girl following a history of having shared an unsterilized needle with another friend who, 1 month later, developed jaundice. Other possible causes for the hyperbilirubinemia were considered and refuted. No icterogenic food or drug other than tetracycline and no hepatotoxic agent had been ingested. In view of the history of unsterilized needle usage, the incubation period of 2 months following exposure and the slow resolution of the disease, the disease process was thought to be viral serum hepatitis. The most likely etiology of an accompanying exudative pleural effusion with a predominance of lymphocytes in this case was tuberculosis; however, no evidence supported that diagnosis. Other diagnoses including pancreatitis considered to explain the pleural effusion, were discarded. Since the effusion and the prodromal symptoms of hepatitis appeared concurrently and since no etiological agent for the effusion was found, the pleural effusion was apparently a complication of viral hepatitis in this patient.

3424 AUSTRALIA ANTIGEN AND HEPATITIS. AN ELECTRON MICROSCOPIC STUDY. (E.)
Nisar Ahmed, M., S. Huang (McGill U. Inst. Pathol., Montreal, Quebec, Canada) and L. Spence. *Arch. Pathol.* 92(1):66-72, 1971.

A renal transplant patient at postmortem examination showed chronic active viral hepatitis. The complement fixation test for the Australia antigen was positive on 4 of 6 occasions. With electron microscopy, about 50% of the hepatic cells showed the presence of spherical Australia antigen-like particles of 200-210 Å in diameter. Most particles, present throughout the entire nucleus and hyaloplasm of the degenerative cell, were hallow in the center, some had an electron-dense central core and all particles showed surface units of approximately 20-30 Å in diameter. Particles were resistant to diastase. The ultrastructural morphology strongly suggests that these particles are viruses. Since many of the affected hepatocytes showed only focal cytoplasmic degradation without total necrosis, the hepatocytes can apparently tolerate the virus in active but not chronic viral hepatitis. The morphologic demonstration of viral agent in this case further suggests that the Australia antigen is an etiologic agent of viral hepatitis.

3425 HEPATITIS-ASSOCIATED ANTIGEN: IMPROVED SENSITIVITY IN DETECTION. (E.)
Ashcavai, M. (U. Southern California Sch. Med., Los Angeles) and R. L. Peters. *Am. J. Clin. Pathol.* 55(3):262-267, 1971.

An improvement in the detection of the hepatitis associated antigen by concentrating the test serum was reported. Concentration of serum increased the sensitivity of hepatitis-associated antigen approximately tenfold. The method increased the yield of positive reactions in sera of patients with viral hepatitis and allowed demonstration of serum antigen further into convalescence, but it did not give false positive reactions. Nonspecific precipitation arcs, (straight and fuzzy), often crossing the control arcs, were demonstrable, but usually were observed in sera of patients with other diseases, particularly autoimmune diseases (lupoid hepatitis) associated with high globulin levels. The detection of hepatitis antibody in test serum was also improved by concentration.

3426 RED CELL LIPIDS IN LIVER DISEASE: RELATIONSHIP TO SERUM LIPIDS AND TO LECITHIN-CHOLESTEROL ACYLTRANSFERASE. (E.)
Simon, J. B. (Queens U., Kingston, Ontario, Canada). *J. Lab. Clin. Med.* 77(6):891-900, 1971.

Erythrocyte cholesterol levels were high in 19 of 21 patients with a variety of acute and chronic liver diseases. Values in the 2 subjects with hyperlipoproteinemia but no hepatic disorder were normal. Red cell total phospholipids were minimally or modestly elevated in only 5 patients, 4 of which had severe acute viral or toxic hepatitis. Cholesterol levels in the red cell tended to reflect the severity of hepatic dysfunction. There was a positive correlation between red blood cell cholesterol and serum bilirubin levels, the relationship being much closer in patients with acute hepatocellular disease than in those with chronic liver disorders. The former patients also had a direct relationship between erythrocyte cholesterol and serum SGOT levels. Elevated erythrocyte lipids were not merely a passive reflection of high serum concentrations. There was an inverse relationship between lecithin-cholesterol acyltransferase activity and red cell cholesterol levels. Enzyme activity was normal in the 2 subjects with hyperlipoproteinemia and was unrelated to erythrocyte total phospholipid levels. By regulating esterification of plasma cholesterol, the above enzyme may help to control the availability of free cholesterol for exchange with erythrocytes.

3427 NEONATAL HEPATITIS. I. STUDIES ON THE ACUTE PHASE OF THE DISEASE. (Ger.) Beseler, W.-D. (Univ. Pediatr. Clin., Bonn, Germany) and H. W. Rotthauwe. *Z. Kinderheilkd.* 110(1):10-32, 1971.

Clinical follow-ups were made for 5 yr on 12 children (6 boys and 6 girls) with neonatal hepatitis. Jaundice developed from age 1 day to age 3 months and lasted for 30-150 days. One patient had hemolytic jaundice caused by an AO-incompatibility. Maximum serum bilirubin concentrations ranged from 2.3-23 mg/100 ml. In all patients serum bilirubin levels decreased with increasing age and, in most cases, normalized by age 5 mo. SGOT and SGPT activities were high to very high in 11 of the 12 patients; SGPT activities were higher than SGOT activities in 10 of the 12. Transaminase activities remained elevated longer than bilirubin concentrations in 10 cases. Activities of glutamate dehydrogenase were slightly to moderately elevated in 10 cases and those of alkaline phosphatase were in the upper normal range or slightly to moderately elevated. In the 3 cases in which it was determined leucine aminopeptidase was only slightly increased. During jaundice most children had moderate to large decreases in prothrombin but other clotting factors studied were within the normal range or only slightly changed. Excretion of ^{131}I-labeled bengal rose was normal in 1 and slightly delayed in 1 patient. Percutaneous liver biopsies performed during the icteric phase in 5 cases showed marked cholestasis and multinucleated giant cells in 3 cases. One patient who was being treated with corticosteroids died at age 5.5 months of septicemia.

3428 HEPATITIS ASSOCIATED ANTIGEN (HAA) IN HAWAII. (E.) Hayami, A. (Tsuchiya Hosp., Hiroshima, Japan), E. Yamate, T. Tsuchiya and M. Yokoyama. *Hiroshima J. Med. Sci.* 19(4): 151-157, 1971.

3429 ACUTE HEPATITIS AND THE AUSTRALIAN-SH ANTIGEN. (Ger.) Gnan, F. (Univ. 1st Med. Clin., Vienna), W. Felkl, O. Krassnitzky, F. Pesendorfer and F. Wewalka. *Z. Gastroenterol.* 9(3):152-158, 1971.

3430 Q FEVER HEPATITIS. (E.) Dupont, H. L. (U. Maryland Sch. Med., Baltimore), R. B. Hornick and H. S. Levin. *Ann. Intern. Med.* 74(2):198-206, 1971.

3431 INCIDENCE OF AUSTRALIA ANTIGEN AMONG CASES OF VIRAL HEPATITIS FROM THE POPULATION IN THE BIALYSTOK AREA. (Ger.) Boron, P. (Med. Akad. Infect. Dis. Clin., Bialystok, Poland) and E. Sokolewicz. *Dtsch. Gesundheitsw.* 25(51):2408-2411, 1970.

3432 AUSTRALIAN ANTIGEN AND VIRAL HEPATITIS. (It.) Ragazzini, F. (U. Florence Inst. Clin. Pediatr., Italy) and A. Vierucci. *Folia Allergol. (Roma)* 17(1):1-9, 1970.

3433 ICTERIC AND ANICTERIC TRANSFUSION HEPATITIS. INCIDENCE AND COURSE, A PROSPECTIVE STUDY IN 561 PATIENTS. (Ger.) Schricker, K. T. (U. Erlangen/Nuremberg Surg. Clin., Germany) and W. Ryba. *Fortschr. Med.* 88(34):1371-1376, 1970.

3434 PATHOMORPHOLOGY OF SO-CALLED SUBACUTE HEPATITIS IN THE LIGHT OF BIOPSY AND AUTOPSY OBSERVATIONS. (Pol.) Nazarewicz, T. (Med. Acad. Inst. Pathol. Anat., Gdansk, Poland). *Patol. Pol.* 21(4):761-775, 1970.

3435 THE PROBLEM OF POSITIVE ATYPICAL RESULTS OF THE JIRGL TEST IN VIRAL HEPATITIS. (Pol.) Szymanska, H. (Med. Acad. 2nd Intern. Dis. Clin., Stettin, Poland), A. Paderewska, M. Stepien and K. Smoczynska-Zenczakowa. *Pol. Tyg. Lek.* 25(34):1277-1280, 1970.

3436 VIRAL HEPATITIS AND THE AUSTRALIA ANTIGEN. PRELIMINARY RESULTS OF A CAMPAIGN FOR THE DETECTION OF AUSTRALIA ANTIGEN IN A MILITARY ENVIRONMENT. (Fr.) Antoine, H. M., R. Nicolle and P. Lebon. *Rev. Corps Sante Armees* 11(5):685-691, 1970.

3437 INFECTIOUS HEPATITIS IN THE STATE OF GUANABARA. (Por.) Marangoni, O. B. (Suseme Dept. Public Health, Rio de Janeiro, Brazil), E. Henrique, E. H. Capistrano Do Amaral and A. Bittencourt Furtado. *Rev. Med. Estado Guanabara* 37(1):101-120, 1970.

3438 RHEUMATOID FACTOR AND ITS PROGNOSTIC SIGNIFICANCE IN VIRAL HEPATITIS. (Rus.) Proskuriakova, N. B., V. A. Ananiev and B. L. Ugriumov. *Sov. Med.* 33(12):11-14, 1970.

3439 SOME PRESENT PROBLEMS OF VIRAL HEPATITIS. HEPATITIS ANTIGEN. (Rum.) Cajal, N. (Stefan S. Nicolau Inst. Virol., Bucharest, Rumania) and I. Strati. *Stud. Cercet. Inframicrobiol.* 21(5):391-412, 1970.

3440 ELECTRON MICROSCOPIC STUDIES OF VIRUS HEPATITIS IN DUCKLINGS. II. OBSERVATIONS ON THE SPLEEN AND THE MUSCULATURE. (Ger.) Adamiker, D. (Vet. Sch., Vienna, Austria). *Zentralbl. Veterinarmed.* [*B*] 17(8):880-889, 1970.

3441 ASSOCIATION OF VIRUS LIKE PARTICLES WITH AUSTRALIA ANTIGEN IN SERUM OF PATIENTS WITH SERUM HEPATITIS. (E.) Zalan, E. (Ontario Dept. Health Virus Lab., Toronto, Canada), J. J. Hamvas and B. A. Tobe. *Can. Med. Assoc. J.* 104(2):145-147, 1971.

3442 INFECTIVE HEPATITIS: LABORATORY PRECAUTIONS. (E.) McLellan, D. S. and D. M. Canning. *Gaz. Inst. Med. Lab. Technol.* 15(1):5-6, 1971.

3443 AUSTRALIAN ANTIGEN AND HEPATITIS. (Fr.) Duffaut, M. (Purpan Hosp., Toulouse, France). *Rev. Med. Toulouse* 7(1):21-29, 1971.

3444 AUDITORY NERVE INVOLVEMENT IN VIRAL HEPATITIS. (Rus.) Martinenko, I. I., E. A. Ladizhenskaia, I. K. Musabaev and M. Turapov. *Vestn. Otorinolaringol.* 33(1):97-101, 1971.

3445 AUSTRALIA ANTIGEN AND CANINE HEPATITIS VIRUS. (Fr.) Maupas, P. (Sch. Med. Pharm., Tours, France). *C. R. Soc. Biol. (Paris)* 164(2):387-389, 1970.

3446 PSEUDO ACUTE ABDOMEN IN VIRAL HEPATITIS IN INFANCY. (It.) Dello Russo, R. (Pellegrini Hosp., Naples, Italy) and V. Dettori. *Osped. Ital. Pediatr. Spec. Chir.* 4(4):183-194, 1970.

See also numbers: 2935, 3447

CHRONIC HEPATITIS

3447 ROLE OF SERUM HEPATITIS VIRUS IN CHRONIC LIVER DISEASE. (E.) Prince, A. M. (New York Blood Ctr., N. Y.). *Gastroenterology* 60(5):913-921, 1971.

Most authors have found serum hepatitis antigen in a high but variable proportion of chronic active hepatitis cases. It is present in a lower proportion of cases reported from Great Britain, Denmark, Australia and Chile. Frequencies of antigen significantly greater than those present in control populations have been observed in cases of cryptogenic and postnecrotic cirrhosis. A very low frequency of the antigen is seen in alcoholic cirrhosis, suggesting that this may be an etiologically distinct entity. More than 60% of all primary carcinomas of the liver occur in patients with pre-existing cirrhosis, and more than 40% of autopsied cases of cirrhosis in Africa have co-existing carcinoma. Recently, studies, employing sensitive immunological techniques, have revealed a frequency of serum hepatitis antigen in primary liver cancer cases that greatly exceeded that found in controls. With more sensitive techniques (radioimmunoassay and hemagglutination inhibition) a higher proportion of chronic liver disease patients will probably be found to be chronic serum hepatitis antigen carriers.

3448 NEONATAL HEPATITIS. II. FOLLOW-UP STUDIES. (Ger.) Rotthauwe, H. W. (Univ. Pediatr. Clin., Bonn, Germany) and W.-D. Beseler. *Z. Kinderheilkd.* 110(1):33-45, 1971.

Follow-up studies of 11 children with neonatal hepatitis showed that 9 had no clinical or laboratory evidence of chronic damage to the hepatic parenchyma. The acute phase of the disease had occurred 2-7 yr previously in 10 cases and 3 months previously in 1 case. An 8-yr-old boy who was mentally retarded had persistent hepatosplenomegaly, pathological liver function tests, and slightly increased SGOT activity but the only evidence of hepatitis found in a liver biopsy was slight activation of Kupffer's cells; no fibrosis or other parenchymal changes were present. A 7.5-yr-old boy with slightly increased serum bilirubin, abnormal BSP excretion, and normal transaminase activities had nonspecific parenchymal changes which included low-grade portal fibrosis; no evidence of cirrhosis was present.

3449 CHRONIC ACTIVE HEPATITIS COMBINED WITH CHRONIC DESTRUCTIVE, NONSUPPURATIVE CHOLANGIITIS ("PRIMARY BILIARY CIRRHOSIS"). (Ger.) Ruckstuhl, P. (Waid City Hosp., Zurich, Switzerland), B. Cueni and M. Schmid. *Schweiz. Med. Wochenschr.* 101(20):741-743, 1971.

3450 INFLUENCE OF EXERCISE ON THE SERUM TRANSAMINASE ACTIVITIES IN VARIOUS STAGES OF HEPATITIS. (Kor.) Choon Suhk Kee (Catholic. Med. Coll., Seoul, Korea). *J. Cathol. Med. Coll. (Seoul)* 18(14):263-269, 1970.

3451 THE PRINCIPLES OF OCCUPATIONAL GUIDANCE, OCCUPATIONAL REHABILITATION AND EMPLOYMENT OF PERSONS WITH CHRONIC HEPATITIS. (Rum.) Georgescu, A. (Bucharest, Rumania), E. Gulan, A. Serbanescu and C. Comisioner. *Viata Med.* 17(16):761-765, 1970.

See also numbers: 2914, 3426, 3457, 3487

CIRRHOSIS

3452 SERUM AND LIVER PHOSPHATIDES IN CIRRHOSIS. (Ger.) Wolfram, G. (Univ. Med. Polyclin., Munich, Germany) and N. Zöllner. *Klin. Wochenschr.* 49(4):199-205, 1971.

Serum phospholipids from 30 normal controls, 2 hepatitis patients, and 12 cirrhosis patients were separated by thin-layer chromatography and measured quantitatively. Patients with hepatitis had increased levels of total phospholipids which were due primarily to increases in lecithin. In cirrhosis total phospholipid levels were within the normal range, but standard deviations from the mean was twice that found in controls. Lecithin levels were higher and mean values for lysolecithin and sphingomyelin were lower than in controls; cephalin levels did not differ significantly from control values. A comparison of fatty acid phosphatides in serum from 10 normal controls and 10 patients with cirrhosis by means of gas chromatography showed that oleic and linoleic acid levels were increased in cirrhotics but palmitic and stearic acid levels did not differ significantly from those in controls. Similar but less pronounced changes were found in 2 patients each with chronic hepatitis, cholangitis, and obstructive jaundice. Phosphatide fractions in the liver differed from those in the serum in 2 autopsied cirrhotics. While the lecithin content was normal, the cephalin content was decreased and lysolecithin and sphingomyelin contents were increased. In 1 of these patients who had carcinoma of the liver in addition to cirrhosis the composition of phosphatide fractions in the tumor was similar to that in cirrhotic tissue. Changes in fatty acid phosphatides were similar in the liver and serum in cirrhosis.

3453 HEMODYNAMIC CONTRASTS BETWEEN SELECTIVE AND TOTAL PORTAL-SYSTEMIC DECOMPRESSION. (E.) Salam, A. A. (U. Miami Sch. Med., Fla.), W. D. Warren, J. R. LePage, M. R. Viamonte, D. Hutson and R. Zeppa. *Ann. Surg.* 173(5):827-844, 1971.

The similarities and differences in 3 major types of portal systemic shunts and the advantages and disadvantages of each procedure were determined in 47 patients. While the side-to-side portocaval shunt produced complete decompression of portal venous hypertension, and maximal decompression of esophageal varices and intrahepatic pressure, it completely abolished portal venous flow to the liver and lessened the total hepatic blood flow. Side-to-side splenorenal shunts produced similar results but to a lesser degree for all parameters. Selective distal splenorenal shunts provided for continued portal vein perfusion of the liver while satisfactorily decompressing esophageal varices and eliciting no change in intrahepatic pressure or total hepatic blood flow.

3454 ALTERATIONS IN ^{3}H-ESTRADIOL DISTRIBUTION FOLLOWING PORTACAVAL SHUNT. (E.) Fischer, J. E. (Massachusetts Gen. Hosp., Boston) and A. J. Eisenfeld. *Surgery* 69(5):655-662, 1971.

Mature female Osborne-Mendel rats were subjected to end-to-side portacaval shunts and oophorectomized mature Sprague-Dawley rats were subjected to either portacaval shunts or acute major hepatectomy. One hour following i.v. injection of ^{3}H-estradiol into intact portacaval shunted rats there was a high concentration of label in the plasma, cerebrum, anterior pituitary, hypothalamus and heart, but not in the uterus and vagina. Similar results were seen in the previously oophorectomized and portacaval shunted rats. Results were also similar (increased uptake in cerebrum, heart and hypothalamus but not in uterus or vagina) in previously oophorectomized rats that were subjected to 90% hepatectomy. These results were not seen in rats preloaded with estrogens. Elevated plasma levels secondary to liver damage are responsible for increased radioactivity levels found in the anterior pituitary, hypothalamus, cerebrum and heart. It is hypothesized that one reason both the uterus and vagina failed to develop increased estrogen concentrations is due to an interruption or failure of the liver to secrete a substance which aids in the transfer of estrogen across the uterine and vaginal cell membrane.

3455 TRANSJUGULAR INTRAHEPATIC PORTACAVAL SHUNT. AN EXPERIMENTAL WORK. (E.) Rösch, J. (U. Oregon Med. Sch., Portland), W. Hanafee, H. Snow, M. Barenfus and R. Gray. *Am. J. Surg.* 121(5):588-592, 1971.

A transjugular intrahepatic portocaval shunt with the use of a modified Ross needle-catheter system was performed in 40 dogs (normals, cirrhotic, portal hypertensive). The shunt efficiency depended on the size of the tubing used and the pressure in the portal circulation.

With large diameter (5 mm) coated spring coil tubing in dogs with portal hypertension, the total portal blood was shunted to the systemic circulation. The nonthrombogenic character of the material (Teflon, Silastic), the inner diameter of the shunt and the degree of shunting were major factors in the maintenance of shunt patency. Clinically, the shunt could probably be left in place for 6-10 days before the patient recovers and nonemergency surgery with a definitive portocaval shunt could be performed. There is also the possibility that the cirrhotic liver may not contract following removal of the shunt and that a fistulous tract will remain thus providing continued relief of portal hypertension.

3456 MALLORY BODIES IN LIVER BIOPSIES WITH FATTY CHANGES BUT NO CIRRHOSIS. A MORPHOLOGICAL, BIOCHEMICAL AND CLINICAL INVESTIGATION. (E.) Christoffersen, P. (Municipal Hosp., Copenhagen, Denmark) and E. Juhl. *Acta Pathol. Microbiol. Scand.* [*A*] 79(2):201-207, 1971.

Liver biopsies from 83 patients with fatty change as the chief morphological diagnosis were compared with regard to histological and biochemical parameters in an attempt to differentiate those with Mallory bodies from those without. Eleven of the biopsies in the group with Mallory bodies (group I) exhibited changes as seen in alcoholic hepatitis. Biopsies from patients in group I showed a greater percentage of acidophil bodies, parenchymal inflammation, parenchymal and portal fibrosis, and portal inflammation than those from patients with fatty livers without Mallory bodies. No significant difference in the incidence of lipogranulomas, lytic liver cell necroses, variation in size of nuclei and cells, portal inflammation, bile duct proliferation, cholestasis, content of iron and lipofuscin or degree of fatty change existed between the 2 groups. Serum asparatetransaminase and BSP-retention were elevated in both groups, but significantly higher in the group with Mallory bodies, while a reduction in serum albumin was also observed in these patients.

3457 TRYPTOPHAN METABOLISM IN LIVER DISEASE. (E.) Hirayama, C. (Kyushu U. Fac. Med., Fukuoka, Japan). *Clin. Chim. Acta* 32(2): 191-197, 1971.

Plasma tryptophan levels were determined in the fasting state and after p.o. administration of tryptophan in 13 normal subjects, 11 patients with chronic hepatitis, and 24 patients with non-alcoholic cirrhosis using a specific fluorometric assay. In 11 patients with chronic hepatitis, tryptophan and α-amino nitrogen levels were not significantly different from normal levels. Patients with cirrhosis exhibited slightly elevated plasma tryptophan and α-amino nitrogen levels, however, these increases were not significant. The levels of tryptophan and α-amino nitrogen were significantly elevated in patients with hepatic encephalopathy or coma. Cirrhotic patients demonstrated higher tryptophan levels than controls following tryptophan loading. Two thirds of these patients complained of neurological signs and symptoms after tryptophan ingestion. In 7 cirrhotic patients under treatment by microsomal enzyme inducers, who showed almost identical conditions in regard to liver tests with the non-treated cirrhosis group, an improvement was seen in the tryptophan loading test. Delayed removal of tryptophan seems to occur in patients with cirrhosis.

3458 LIVER CIRRHOSIS IN THREE SCANDINAVIAN COMMUNITIES. AN ATTEMPT AT A CRITICAL EVALUATION OF AVAILABLE EPIDEMIOLOGIC DATA. (E.) Wadman, B. (Univ. Hosp., Uppsala, Sweden), E. S. Spencer and I. Werner. *Acta Med. Scand.* 189(3): 221-230, 1971.

Liver cirrhosis was studied epidemiologically in 3 Scandinavian communities. In both Sweden and Denmark, liquor consumption has shown a slow continuous increase during the period of observation. In one of the Swedish communities (urban) there was a small but distinct increase in morbidity and mortality of liver cirrhosis within years immediately following the alcohol consumption. In the Swedish rural region, a slight tendency to increased incidence of liver cirrhosis similar to that seen in the urban region was observed. In total, there was a considerable increase in registered morbidity and mortality in the region during the whole period. In contrast to the Swedish series, the increased incidence of liver cirrhosis in selected, vulnerable age groups can undoubtedly provide excellent means for following the effect of sudden changes in alcoholic habits. However, incidence figures for liver cirrhosis cannot be used as a measure of the degree of alcoholic abuse in comparing one population with another or in longitudinal studies with slow and/or moderate changes in alcoholic habits.

3459 BILE ACID METABOLISM IN PATIENTS WITH CIRRHOSIS. I. KINETIC ASPECTS OF CHOLIC ACID METABOLISM. (E.) Vlahcevic, Z. R. (VA Hosp., Richmond, Va.), I. Buhac, J. T. Farrar, C. C. Bell, Jr. and L. Swell. *Gastroenterology* 60(4):491-498, 1971.

The total and component (cholic, chenodeoxycholic, deoxycholic, and lithocholic) bile acid pools, daily production of cholic acid, and cholic acid half-life were determined in 8 patients with cirrhosis and compared with 9 patients without liver disease following oral administration of ^{14}C-cholic acid and subsequent daily sampling of duodenal fluid. The cholic acid production in cirrhotic patients was less than one-third that of the control group (101 versus 358 mg/day). The total bile acid pool was significantly smaller in patients with cirrhosis when compared with the normal control group (1.28 versus 2.38 g), i.e. patients with cirrhosis had a bile acid pool 46.2% smaller than normal controls. The cholic, chenodeoxycholic, and deoxycholic acid pools were also significantly smaller in cirrhotic patients. In patients with cirrhosis, deoxycholic acid was frequently either absent or present in trace amounts. Lack of sufficient bile salts in the small intestine may account for the non-pancreatogenic steatorrhea observed in some cirrhotic patients.

3460 RED BLOOD CELL TRANSKETOLASE ACTIVITY AND BLOOD LACTATE AND PYRUVATE IN PATIENTS WITH CIRRHOSIS OF THE LIVER. (E.) Presser, J. I. (U. New Mexico Sch. Med., Albuquerque), M. Farmer, M. Shoberg, C. A. Vaamonde and S. Papper. *Digestion* 4(2):72-80, 1971.

Red blood cell transketolase activity (pentose disappearance) in the cirrhotic group was normal and not significantly different from the control group (normal volunteers and chronically ill noncirrhotic patients receiving adequate thiamine intake). Thiamine supplementation did not significantly affect transketolase activity in any patient. Blood lactate and pyruvate levels and lactate/pyruvate ratios were significantly higher in the cirrhotics than in the control group. Although mean $PaCO_2$ and pHa values in the cirrhotic patients were similar to those of the control subjects, the cirrhotics with lower $PaCO_2$ and higher pHa tended to have higher lactate and pyruvate. Thus, some effect of hyperventilation on lactate concentration may be occurring. PaO_2 was lower in the cirrhotic group. Apparently these patients can utilize thiamine normally, and factors other than thiamine deficiency, such as circulatory changes, cellular damage and hyperventilation, may explain the alteration in lactate-pyruvate metabolism observed in these patients.

3461 PERITONEOSCOPIC FEATURES OF INTRAABDOMINAL VESSELS IN CIRRHOSIS OF THE LIVER. (E.) Jori, G. P. (U. Naples Inst. Med. Pathol., Italy) and G. Mazzacca. *Gut* 12(4):237-244, 1971.

The morphological features of the intraabdominal veins were studied in 57 cirrhotic patients via periteoscopy and on the basis of these findings, the subjects were classified into 4 groups (normal, minimal, moderate, or marked alterations). Twenty five patients (43.8%) proved to have normal intraabdominal veins. Minimal intraabdominal venous changes were observed in 16 patients (28%), whose vascular engorgement was limited to the falciform and teres ligaments. Alterations in intraabdominal veins were moderate in 10 patients (17.5%). In this group, moderately congested vessels were seen on ligaments, on the greater and lesser omentum, and on the parietal peritoneum, mostly at the subdiaphragmatic surface. Six patients (1%) showed severe venous alterations, the veins appearing diffusely and conspicuously increased both in number and size, and newly formed channels were seen. Patients in all 4 groups exhibited increased intrahepatic and intrasplenic pressures, however, splenomegaly was more frequent and of a higher degree in patients with normal intraabdominal veins. Ascites was never found in patients with normal veins, the frequency increasing with the severity of alteration up to 100% in the last group. Percutaneous splenoportography, carried out in 16 patients, did not correlate well with peritoneoscopic findings.

3462 ERYTHROPOIETIC PROTOPORPHYRIA: TWO DEATHS FROM HEPATIC CIRRHOSIS. (E.) Donaldson, E. M. (North Staffordshire Hosp. Ctr., Stoke-on-Trent, England), S. J. McCall, I. A. Magnus, J. R. Simpson, R. A. Caldwell and T. Hargreaves. *Br. J. Dermatol.* 84(1):14-24, 1971.

Two patients with erythropoietic protoporphyria and who died from hepatic cirrhosis were presented. In both cases granular protoporphyrin was abundant within the hepatocytes, and gross swelling of these cells was common. A striking feature was the rapid development of jaundice, leading finally to liver failure in middle aged men suffering from a metabolic disorder of many years standing. Early liver damage in erythropoietic protoporphyria is not revealed by the majority of the commonly used liver function tests, the BSP retention test being essential for its detection. Failure of the liver to excrete protoporphyrin causes a great increase in the plasma level and consequently in the erythrocyte protoporphyrin. It is well to consider the possibility of erythropoietic protoporphria in patients with unexplained jaundice, hepatomegaly or abdominal pain.

3463 THE RESULTS OBTAINED WITH EMERGENCY SURGERY IN THE TREATMENT OF PERSISTENT HAEMORRHAGE FROM GASTRO-OESPHAGEAL VARICES IN THE CIRRHOTIC PATIENT. (E.) Rothwell, R. L. (Lutton and Dunstable Hosp., London) and A. H. Hunt. *Br. J. Surg.* 58(3):205-215, 1971.

Surgical control in a group of 77 cirrhotic patients with persistent gastro-esophageal bleedin is discussed. Of 8 cases who had an emergency portacaval anastomosis, 4 survived and these were all good risk cases. A poor risk case has a 30% chance of survival with a Boerema-Crile operation. An advantage of the latter operation is that it does not divert portal blood from the liver, the effect of surgery being strictly one of stopping hemorrhage. The one factor which mitigates most strongly against success with any form of surgery in many of these patients is the initial delay in obtaining hemorrhage control.

464 SUDDEN SCROTAL EDEMA IN CIRRHOSIS: A POSTPARACENTESIS SYNDROME. (E.) Conn, . C. (Yale U. Sch. Med., New Haven, Conn.). nn. *Intern. Med.* 74(6):943-945, 1971.

paracentesis of 7000 ml was performed on a atient with Laennec's cirrhosis and tense scites. The next morning the patient showed assive soft scrotal edema. The 0.5 mm paraentesis slit had been closed with 2 silk sutures, ut small drops of clear fluid appeared at the dge of the wound. Apparently the paracentesis ad created a fistula between the peritoneum and he subcutaneous tissues of the abdominal wall, nd under the effect of gravity ascitic fluid had oved into the scrotum. The fluid apparently issected between Camper's and Scarpa's fascial r within Scarpa's fuscia which is loosely bound o the ventral fascial envelope of the abdominal uscles and is continuous with the loose subutaneous tissue of the scrotum. The patient was reated successfully by elevating his scrotum ith a bridge of toweling across his thighs and ith diuretic therapy. The syndrome can be revented by using a small needle to perform imple diagnostic paracentesis.

3465 SOME CHARACTERISTICS OF ^{35}S-METHIONINE METABOLISM IN CIRRHOSIS. (Sp.) Szantay, I., E. Szirmai and S. Cotul. *Acta Oncol. (Madr.)* 9(2):220-225, 1970.

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3467 FILLING DEFECT IN THE COLON DUE TO PORTAL HYPERTENSION. (E.) Shin, S. I., G. W. Easley, J. A. Raquel, C. J. Kim and C. B. Mendoza, Jr. (VA Hosp., Clarksburg, W. Va.). *Am. Surg.* 37(7):413-417, 1971.

3468 HEPATIC ARTERIAL BLOOD FLOW IN PORTAL HYPERTENSION AND LIVER CIRRHOSIS. (Ger.) Voegeli, E. (Cent. Radium Inst., Bern, Switzerland). *Schweiz. Med. Wochenschr.* 101(20):767, 1971.

3469 MEDICAL TREATMENT OF PORTAL HYPERTENSION. (E.) Garabedian, M. and F. F. Whitcomb, Jr. *Surg. Clin. North Am.* 51(3):749-760, 1971.

3470 PROGNOSIS FOR PORTOSYSTEMIC ANASTOMOSES IN CIRRHOTICS: USE OF DISCRIMINANT ANALYSIS AND FACTORIAL ANALYSIS OF RELATIONS. (Fr.) Nakache, J. P., Y. Hecht (St. Antoine Hosp., Paris), H. Georgakopoulos, D. Salmon, C. Garçon and M. H. Giard. *Acta Gastroenterol. Belg.* 34(2):248-262, 1971.

3471 THE SURGICAL TREATMENT OF PORTAL HYPERTENSION. EARLY AND LATE RESULTS. (Fr.) Mégevand, R. (Sch. Med., Geneva, Switzerland) and F. Griessen. *Acta Gastroenterol. Belg.* 34(2):193-199, 1971.

3472 LATE RESULTS OF THE SURGICAL TREATMENT OF PORTAL HYPERTENSION. (Fr.) van der Stricht, J. (Ave. Henri Jaspar 114, Brussels, Belgium) and M. Goldstein. *Acta Gastroenterol. Belg.* 34(2):200-207, 1971.

3473 PRIMARY LIVER CARCINOMA AS A COMPLICATION OF LIVER CIRRHOSIS. (Pol.) Smiech-Brudnik, B. (Slaskiej Med. Acad., Katowice, Poland) and M. Machalski. *Pol. Arch. Med. Wewn* 45(4):549-554, 1970.

3474 MODERN VIEWS ON THE PORTO ARTERIAL OR CONNECTIVE PARENCHYMAL CIRCULATORY IMBALANCE IN CIRRHOSIS OF THE LIVER AND ITS IMPORTANCE IN PATHOGENESIS AND IN VASOSURGICAL MANAGEMENT. (It.) Paterni, L. (U. Rome Dept. Med.). *Minerva Med.* 61(91):5169-5179, 1970.

3475 TRANSFERRIN AND THE IRON BINDING CAPACITY OF THE SERUM IN CASE OF CIRRHOSIS, HEMOCHROMATOSIS AND PORPHYRIA CUTANEA. (It.) Albertini, A. (Civil Hosp., Brescia, Italy), E. Radaeli, L. Spandrio and G. Andreis. *Metabolisma* 5(3):303-321, 1970.

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3477 THE VALUE OF ANGIOGRAPHY OF THE PORTAL VEIN AND HEPATIC VEINS IN PORTAL HYPERTENSION. II. INTRA AND POSTHEPATIC OBSTACLES. (Rum.) Boiu, S. (Fundeni Clin. Hosp., Bucharest, Rumania), D. Setlacek, N. Florea Panait and A. Popovici. *Oncol. Radiol. (Bucur.)* 9(6):503-510, 1970.

3478 STUDIES ON THE BEHAVIOR OF THE BLOOD CLOTTING AND FIBRINOLYTIC SYSTEMS IN SUBJECTS SUFFERING FROM LIVER CIRRHOSIS. (Pol.) Lukasiewicz, H. (Med. Acad. 1st Surg. Clin., Warsaw, Poland) and J. Nielubowicz. *Pol. Przegl. Chir.* 42(10):1391-1397, 1970.

3479 USE OF COLLOIDAL RADIOGOLD (^{198}Au) IN THE STUDY OF PORTAL HYPERTENSION AND OF HEPATIC CIRRHOSIS. II. PHYSIOPATHOLOGIC FINDINGS. (It.) Bertolotti, A. (U. Rome 1st Gen. Surg. Clin.). *Progr. Med. (Roma)* 26(12):335-337, 1970.

3480 ESOPHAGEAL VARICES IN PORTAL HYPERTENSION. (Sp.) Andreu Oller, L. (Santa Cruz y San Pablo Hosp., Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 32(5):529-544, 1970.

3481 INDICATIONS FOR SPLENECTOMY IN CIRRHOSIS. (Fr.) Lorriaux, A. (CHU Med. Clin. A, Amiens, France) and F. Gentit. *Sem. Hop. Paris* 46(37-38):2337-2340, 1970.

3482 HEPATIC CELL CARCINOMA ARISING FROM CIRRHOSIS OF THE LIVER IN RATS. (Rus.) Volgarev, M. N. *Arkh. Patol.* 33(2):38-43, 1971.

3483 TRANSUMBILICAL PORTAL HEPATOGRAPHY IN THE EXPLORATION OF THE LIVER. (Fr.) Lambilliotte, J. P. (Free U. Sch. Med., Brussels, Belgium) and J. C. Pector. *Brux. Med.* 51(1): 5-10, 1971.

3484 THROMBOCYTE AGGREGATION DUE TO ADENOSINE DIPHOSPHORIC ACID IN PATIENTS WITH HEPATIC CIRRHOSIS. (It.) Gandolfo, G. M. (U. Rome Inst. Semeiot. Med.). *Haematol. Lat.* 13(1): 69-76, 1970.

3485 INTERRELATIONS BETWEEN CIRRHOSIS OF THE LIVER AND ATHEROSCLEROSIS. (Bul.) Kertikova, S. *Vatr. Bolesti (Sofiya)* 9(4):30-33, 1970.

3486 COMPARATIVE STUDY OF THE TREATMENT OF PORTAL SYSTEMIC ENCEPHALOPATHY BY LACTULOSE, LACTOBACILLI, AND ANTIBIOTICS. (Fr.) Imler, M. (CHU Med. Clin. B, Strasbourg, France), D. Kurtz, R. Bockel and J. Stahl. *Therapeutique* 47(3):237-248, 1971.

3487 CHANGES OF THE DUODENAL MUCOSA IN CHRONIC HEPATITIS AND CIRRHOSIS OF THE LIVER. (Rus.) Shulman, V. S. *Arkh. Patol.* 32(12):53-58, 1970.

See also numbers: 2915, 3447

GALLBLADDER AND BILIARY TRACT DISEASES

3488 EXCRETION OF 3β-HYDROXY-5-CHOLENOIC AND 3α-HYDROXY-5α-CHOLANOIC ACIDS IN URINE OF INFANTS WITH BILIARY ATRESIA. (E.) Makino, I. (Karolinska Inst., Stockholm, Sweden), J. Sjövall, A. Norman and B. Strandvik. *FEBS Lett.* 15(2): 161-164, 1971.

Urine specimens were collected from 4 children with extrahepatic biliary atresia and analyzed for bile acids using chromatographic methods. Aluminum oxide chromatography revealed 5 compounds: methyl 3β-hydroxy-5-cholenoate, methyl 3α-hydroxy-5α- and 3α-hydroxy-5β-cholanoates, and 24ξ- and 26-hydroxycholesterol. Two unidentified compounds gave mass spectra indicative of bile acid structures. All patients excreted large amounts of 3β-hydroxy-5-cholenoic acid. Allolithocholic acid was the major saturated monohydroxycholanoic acid, and 24ξ-hydroxycholesterol was the predominant dihydroxysterol in all samples. Four days after the administration of 4-^{14}C-cholesterol to one patient, the combined fractions containing monohydroxycholanoates and dihydroxysterols contained less than 5% of the amount of radioactivity present in the di- and trihydroxycholanoate fractions.

3489 THE ROLE OF FATTY ACIDS ON CALCIUM ABSORPTION IN OBSTRUCTIVE JAUNDICE IN RATS. (E.) Kostamis, P. (U. Athens Sch. Med., Greece), A. K. Kehayoglou, C. Constandinides, D. Binopoulos and B. Malamos. *Nucl. Med. (Stuttg.)* Suppl. 8:397-402, 1970.

Rats were subjected to operative section of the common bile duct and then absorption of ^{47}Ca^{++} was studied under the influence of admin. of exogenous medium chain triglycerides (mainly octanoic and decanoic acids) in acute (3 days) and chronic (13-16 days) biliary tract obstruction and of long chain triglycerides (as olive oil) in chronic biliary tract obstruction. In acute obstruction without exogenous triglycerides, there was a significant decrease in absorption of Ca^{++} from aqueous solutions of either calcium hydrogen phosphate or calcium phytate. With the addition of medium chain triglycerides, absorption was significantly increased only with calcium phytate, and this was seen only in obstructed and not sham-operated rats. Chronic obstruction in the absence of medium chain triglycerides, resulted in depression of Ca^{++} absorption as in the acute phase. With exogenous medium chain iglycerides, significant increases in absorption Ca^{++} were seen with calcium phytate in obructed and sham-operated rats and with CaCl$_2$ obstructed rats only. In chronically obstructed ts, exogenous long chain triglycerides with rrier CaCl$_2$ did not further decrease the Ca sorption.

90 PALLIATION OF MALIGNANT OBSTRUCTION OF THE COMMON BILE DUCT BY SIDE TO SIDE OLEDOCHODUODENOSTOMY. (E.) Stuart, M. (Cleveland in., Ohio), T. Keo, R. E. Hermann and S. O. err. *Am. J. Surg.* 121(5):505-509, 1971.

side to side choledochoduodenostomy, performed 46 patients with malignant common bile duct struction, uniformly cleared the jaundice pidly. Although morbidity was high, only 15% the complications were related to the biliary-odenal anastomosis. Ascending cholangitis was t seen in 43 surviviors of the operation who entually died (1-40 months after surgery) of e primary disease. The technical goal of side side choledochoduodenal anastomosis is a nerous anastomosis, without tension, as proximal the bile duct as possible, to avoid encroachment advancing neoplasm. The above procedure is e palliative method of choice to relieve resectable malignant obstruction of the distal rt of the common duct, when the gallbladder is rgically absent or otherwise unsuitable for use.

91 THE INFLUENCE OF CALORIE INTAKE AND OF DIETARY PROTEIN ON THE BILE LIPIDS. .) Sarles, H. (INSERM Unit Digest. Pathol. s., Marseille, France), C. Crotte, A. Gerolami, Mule, N. Domingo and J. Hauton. *Scand. J. stroenterol.* 6(2):189-191, 1971.

e concentrations of cholesterol, bile salt, and ospholipid were measured in the hepatic bile of patients with cholesterol gallstones during the gestion of diets of different caloric and otein value. A combined increase in dietary lories and protein was associated with increased turation of cholesterol in bile, i.e., had a thogenic effect. The patient who received ther high calories or high protein independently owed no rise in cholesterol saturation above at seen in the low calorie, low protein regimen. gh calorie diets seemingly owe their lithogenic fect at least in part to their protein content.

92 THE PREVENTION OF RESIDUAL BILIARY CALCULI. (E.) Shore, J. M. (9201 nset Blvd., Los Angeles, Calif.). *Calif. Med.* 4(5):1-6, 1971.

e potential for residual (overlooked and/or formed) biliary calculi amounts to 7% of all olecystectomies. Most of these are overlooked ring operation whereas truly reformed stones e rare. In the majority of patients with residual biliary calculi the common duct was not explored at the primary operation because of reliance on negative cystic duct cholangiograms. Added to this error of false negative cholangiograms is the incidence of silent choledochal stones. The prevention of retained calculi following cholecystectomy may be assured through the use of routine operative cholangiography with television fluoroscopy. Completion cholangiography and biliary endoscopy may be worthwhile in the prevention of retained calculi following choledochotomy. When at the time of choledocholithotomy, biliary stasis (an underlying cause of reformed calculi) is found to be due to a specific lesion, the need for a concomitant biliary drainage procedure is apparent.

3493 EFFECTIVENESS OF CHOLEDOCHODUODENOSTOMY AND TRANSDUODENAL SPHINCTEROTOMY IN THE TREATMENT OF BENIGN OBSTRUCTION OF THE COMMON DUCT. (E.) Thomas, C. G., Jr. (U. North Carolina Sch. Med., Chapel Hill), C. P. Nicholson and J. Owen. *Ann. Surg.* 173(6):845-856, 1971.

The indications, contraindications, morbidity and mortality of transduodenal sphincterotomy and choledochoduodenostomy, as well as their effectiveness in overcoming obstruction and stasis in the common bile duct, were evaluated in 110 patients operated upon for benign extrahepatic biliary tract obstruction. The overall morbidity and mortality rates were 40% and 5.5%, resp. Death was most frequently caused by pancreatitis, cholangitis, and septicemia. The most common postoperative complications were wound infection, atelectasis or pneumonitis and subphrenic or subhepatic abscess. Neither the morbidity nor mortality rates were significantly different when the 2 procedures were compared; both were highly effective in overcoming choledochal obstruction and preventing recurrence of the disease. The indications for each type of procedure are enumerated.

3494 TRAUMATIC FALSE ANEURYSM OF THE RIGHT HEPATIC ARTERY: AN UNUSUAL COMPLICATION OF CHOLECYSTECTOMY. (E.) Andersen, P. T. (Repatriation Gen. Hosp., Concord, Australia). *Aust. NZ J. Surg.* 40(3):273-277, 1971.

A case of traumatic false aneurysm of the right hepatic artery causing jaundice 3 months after cholecystectomy was reported. The patient was correctly managed at the time of trauma in that exposure with proximal control (Pringle's maneuver) was used to obtain good visualization of the bleeding point. The continued trauma of pressure from an adjacent gallstone in a bile duct has been implicated as the etiologic agent, and the adjacent weakening of the walls of the hepatic artery and bile duct may explain the frequency with which bleeding occurs into the bile ducts. A triad of symptoms generally occur with traumatic false aneurysm: upper abdominal pain, gastrointestinal or intraperitoneal hemorrhage and jaundice due to hemobilia or pressure obstruction of the bile ducts. Preoperative aortography, previously advised as the only means of mapping the hepatic arterial tree and arriving at a firm preoperative diagnosis, is an essential part of the investigation. The extremely poor outlook associated with conservative management makes direct attack desirable. The use of the principles of vascular surgery, with the routine administration of antibiotics to reduce the mortality due to liver necrosis in the postoperative phase, may further increase the success rate of surgical salvage.

3495 RELATIONSHIP BETWEEN THE BILIARY EXCRETION OF BILE ACIDS AND THE EXCRETION OF WATER, LECITHIN, AND CHOLESTEROL IN MAN. (E.) Scherstén, T. (Sahlgrenska Hosp., Goteborg, Sweden), S. Nilsson, E. Cahlin, M. Filipson and G. Brodin-Persson. *Eur. J. Clin. Invest.* 1(4): 242-247, 1971.

The effect of different rates of biliary excretion of bile acids on the excretion of water and biliary lipids was studied in 5 patients who had undergone surgery for nonobstructive gallstone disease. A significant and linear relationship existed between the bile acid excretion rate and the rate of water excretion. The excretion rate of lecithin was also related to the bile excretion rate but this relationship was not linear. In 2 patients, a significant and linear relationship existed between the rate of bile acid excretion rate of cholesterol until the rate of bile acid output was below 5 μmoles/min, and in 2 others, no such relationship was seen. The mean value of the bile-acid-dependent excretion rate of lecithin was 0.25 μmole/μmole bile acid, while the mean cholesterol excretion rate was 0.051 μmole/μmole bile acid. The bile acids in the enterohepatic circulation seem to have a primary effect on the synthesis of lecithin in the biliary excretion pool rather than on the excretory mechanism in the hepatocytes.

3496 DILATATION OF THE INTRAHEPATIC BILE DUCTS IN CONGENITAL CYSTIC DILATATION OF THE COMMON BILE DUCT. (E.) Tsuchida, Y. (U. Tokyo 2nd Dept. Surg.) and M. Ishida. *Surgery* 69(5):776-781, 1971.

Subjects consist of 35 consecutive patients with congenital cystic dilatation of the common bile duct seen within a 17-yr period. Preoperative diagnosis was made in 70% of the patients while only 17% presented with the classic triad of pain, jaundice and tumor. Operative procedures consisted of primary excision of the cyst in 22, choledochocystojejunostomy in 9, choledochocystoduodenostomy in 3 and cholecystojejunal bypass anastomosis in 1. In this patient series, primary excision of the choledochal cyst gave the most satisfactory follow up results and is regarded as the operation of choice. Operative cholangiography was performed in 16 of the 35, and all 16 appeared to be the type I of Alonso-Lej. Of the 16, 9 showed either cystic or cylindrical dilatation of the intrahepatic bile duct. Both X-ray, clinical and microscopic studies suggested that these intrahepatic dilatations were of a congenital nature.

3497 CHRONIC ACALCULOUS CHOLECYSTITIS. (E.) Pyrtek, L. J. (Hartford Hosp., Conn.) and S. A. Bartus. *Hartford Hosp. Bull.* 26(1): 3-7, 1971.

Patients with the presumptive diagnosis of cholesterosis based on symptoms alone in whom cholecystectomy was performed were reported. Major presenting symptoms were right upper quadrant pain, fatty food intolerance, and nausea. Laboratory examination and roentgenograph were repeatedly normal. Of 50 patients in whom the gallbladder was removed for presumptive disease 60% had cholesterosis grossly or microscopically; 38% had chronic cholecystitis and 2% had normal gallbladders. A follow-up study (6 months-10 yr later) revealed excellent recovery in 84%. The decision to operate on a patient with typical symptoms of gallbladder disease but with a normal finding on cholecystography is warranted only in specific circumstances. The patient must have persistent disabling symptom resistant to medical management and no other demonstrable source for these symptoms. The incidence of cholecystectomy for the clinical diagnosis of cholesterosis was 5% in the present study; whereas the absolute surgical incidence of cholesterosis is 3.4%.

3498 ACUTE ACALCULOUS CHOLECYSTITIS IN CHILDHOOD. A REPORT OF TWO CASES. (E.) Crystal, R. F. (US Army Hosp., Fort Campbell, Ky.) and R. L. Fink. *Clin. Pediatr.* 10(7):423-426, 1971.

3499 REINVESTIGATION OF THE METABOLISM OF ESTRIOL-16 GLUCOSIDURONATE IN SUBJECTS WITH BILIARY T-TUBE DRAINAGE. (E.) Jirku, H. (New York U. Sch. Med., N. Y.), S. Kadner and M. Levitz. *J. Clin. Endocrinol. Metab.* 32(6): 819-823, 1971.

3500 HEMORRHAGIC CHOLECYSTITIS DUE TO BRUCELLOSIS. (Sp.) Valenzuela Casas, E. *Rev. Esp. Enferm. Apar. Dig.* 33(6):723-726, 1971.

3501 FUNGI IN BILE REMOVED FROM THE GALLBLADDER DURING SURGICAL OPERATION. (Fr.) Paris, J. (Clin. Dig. Dis., Lille, France), J. Biguet, Y. Salembier, S. Andrieu and J.-C. Paris. *Arch. Fr. Mal. App. Dig.* 60(3):123-130, 1970.

3502 REMOVAL OF A RESIDUAL STONE FROM THE COMMON BILE DUCT WITHOUT SURGERY. (E.) Mahorner, H. (Mahorner Clin., New Orleans, La.) and W. J. Bean. *Ann. Surg.* 173(6):857-863, 1971.

3503 EMPHYSEMATOUS CHOLECYSTITIS. (E.) Ferguson, H. L. (1053 Robertson, Fort Collins, Colo.). *Am. Surg.* 37(7):431-433, 1971.

3504 MEDICAL ASPECTS OF BILIARY TRACT LITHIASIS. (Sp.) Martinez, F. *Rev. Esp. Enferm. Apar. Dig.* 33(4):479-496, 1971.

3505 THE ABERRANT DIVISIONAL BILE DUCT. A CASE REPORT. (E.) Tabrisky, J. (Kaiser Found. Hosp., Harbor City, Calif.) and E. L. Pollack. *Radiology* 99(3):537-540, 1971.

3506 THE EFFECTS OF AN ANTISPASTIC AND ANXIOLYTIC PREPARATION IN THE TREATMENT OF DISEASES OF THE GALLBLADDER AND BILIARY TRACT. (It.) Terreni, F. (United Hosps., Livorno, Italy) and E. Taddeucci. *Minerva Gastroenterol.* 17(1): 21-26, 1971.

3507 CARCINOMA OF THE GALLBLADDER. (E.) Ram, M. D. (Mt. Sinai Hosp., Cleveland, Ohio). *Surg. Gynecol. Obstet.* 132(6):1044-1048, 1971.

3508 THE RISK OF ADDITIONAL SURGERY OF THE BILIARY TRACT IN ACUTE CHOLECYSTITIS. (Ger.) Hahnloser, P. (Canton Hosp., Zurich, Switzerland), A. Akovbiantz, K. Krampf and K. Solmsen. *Schweiz. Med. Wochenschr.* 101(20): 743-745, 1971.

3509 HISTOLOGICAL STUDY OF A STRAWBERRY GALLBLADDER WITH BILE PERITONITIS BUT NO PERFORATION. (Ger.) Jonecko, A. (Gorniczy Hosp., Zabrze-Biskupice, Poland) and M. Fryczkowski. *Zentralbl. Chir.* 96(22):743-749, 1971.

3510 MANAGEMENT OF STRICTURES OF THE BILIARY TRACT. (E.) Warren, K. W., J. C. Mountain and A. I. Middell. *Surg. Clin. North Am.* 51(3):711-731, 1971.

3511 PERCUTANEOUS CHOLANGIOGRAPHY. PERSONAL EXPERIENCE. (Sp.) Relimpio Ferrer, F. and M. Librero Cuevas. *Rev. Esp. Enferm. Apar. Dig.* 33(6):709-714, 1971.

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3513 HEPATITIS ASSOCIATED WITH CHOLECYSTITIS. (Sp.) Berenguer, J. (La Fe City Sanit. Dept. Intern. Med., Valencia, Spain), J. Carrasquer, J. Garrido and M. Rodrigo. *Rev. Esp. Enferm. Apar. Dig.* 34(2):129-140, 1971.

3514 GALLBLADDER CANCER. (Sp.) Badosa-Gallart, J. (Gallart Mones Sch. Dig. Pathol., Barcelona, Spain). *Rev. Esp. Enferm. Apar. Dig.* 34(2):141-148, 1971.

3515 IMMUNOLOGICAL STUDY OF THE PROTEIN CONSTITUENTS OF BILE IN CHOLELITHIASIS. (Sp.) Diaz-Rubio Garcia, M. (Sch. Med. Clin., Madrid, Spain). *Rev. Esp. Enferm. Apar. Dig.* 34(2):119-128, 1971.

3516 CANCER OF THE GALLBLADDER. (Sp.) Palma, F. (Provincial Hosp., Jaen, Spain) and J. L. Paloma. *Rev. Esp. Enferm. Apar. Dig.* 33(6):733-738, 1971.

3517 THE VALUE OF PREOPERATIVE CHOLANGIOGRAPHY. OUR EXPERIENCE WITH 350 PATIENTS SUBJECTED TO BILIARY SURGERY. (Sp.) Mariscal, G. and M. Laínez. *Rev. Esp. Enferm. Apar. Dig.* 33(6):707-708, 1971.

3518 GASTRIC BLEEDING IN SOME PATIENTS WITH CHOLELITHIASIS. (Sp.) Oporto, Ruiz, T. (Seville, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(6):727-728, 1971.

3519 SURGICAL TREATMENT OF COMPLETE BILIARY OBSTRUCTION SECONDARY TO CHOLELITHIASIS. (Sp.) Garcia-Donas Abril, A. (U. Seville Sch. Med., Spain). *Rev. Esp. Enferm. Apar. Dig.* 34(2):189-194, 1971.

3520 AN EXTRAHEPATIC BILIARY TRACT ANOMALY. SUGGESTED TECHNIC FOR EARLY IDENTIFICATION AT SURGERY. (E.) Shoemaker, C. P., Jr. and J. C. Baxter (Naval Hosp., Philadelphia, Pa.). *Am. J. Surg.* 121(6):741-742, 1971.

3521 EMPHYSEMATOUS CHOLECYSTITIS. (It.) Dameno, G. (Civil Hosp., Magenta, Italy) and L. Bagnoli. *Riv. Radiol.* 10(3): 393-398, 1970.

3522 BILIODIGESTIVE FISTULAS WITHOUT SYNDROME OF OBSTRUCTION. (Sp.) Ferrando Cucarella, J. (U. Valencia Sch Med., Spain), P. Parrilla Aparicio and E. Nogues Pelayo. *Rev. Esp. Enferm. Apar. Dig.* 33(2):157-162, 1971.

3523 ABNORMAL DRAINAGE OF THE MAIN BILE DUCT INTO A DUODENAL DIVERTICULUM. (Fr.) Bouvier, J. (Bicetre Hosp., Paris), N. Arvay, P. Testas and J. Benchetrit. *Arch. Fr. Mal. App. Dig.* 59(9):612-613, 1970.

3524 RECURRENT LITHIASIS OF THE EXTRAHEPATIC BILE DUCTS. (Rum.) Firica, T. (Colentina Hosp., Bucharest, Rumania) and V. Gradinaru. *Chirurgia (Bucur.)* 19(8):673-684, 1970.

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3527 TREATMENT OF STENOSING INFLAMMATION OF THE SPHINCTER OF ODDI. (Sp.) Stefanini, P. (U. Rome 2nd Surg. Clin.) and M. Carboni. *Prensa Med. Argent.* 57(27):1351-1356, 1970.

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3531 A RARE FORM OF CALCULI IN EXTRAHEPATIC BILE DUCTS. (Rus.) Minasian, A. O. and R. G. Oranesian. *Vestn. Khir.* 105(11):143-144, 1970.

3532 DISTINTEGRATION EFFECTS OF SODIUM HEXAMETAPHOSPHATE ON THE STRUCTURE OF HUMAN GALLSTONE WITH SPECIAL REFERENCE TO SOFT X-RAY FINDINGS. (Jap.) Takeda, K. (Kyushu U. Med. Sch., Fukuoka, Japan). *Igaku Kenkyu (Acta Med. (Fukuoka))* 40(5):404-418, 1970.

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3544 ROENTGENOLOGICAL INDICES OF THE CONCENTRATION FUNCTION OF THE GALLBLADDER IN CHRONIC CHOLECYSTITIS. (Rus.) Poliak, E. Z. *Klin. Med. (Mosk.)* 49(2):46-52, 1971.

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3545 THE PROGNOSIS AND RISK OF MISSING MALIGNANT DISEASE IN PATIENTS WITH UNEXPLAINED AND FUNCTIONAL DIARRHOEA. (E.) Hawkins, C. F. (Queen Elizabeth Hosp., Birmingham, England) and R. Cockel. *Gut* 12(3):208-211, 1971.

To assess the risk of missing malignant disease, 163 patients with chronic diarrhea of more than 6 weeks' duration, in whom investigation failed to reveal an organic basis for the diarrhea, were surveyed from 2-20 yr after their first out-patient visit. Diarrhea had ceased in 63 patients (38.5%), had become intermittent or occasional in 47 (28.8%), and was persistent in 34 (20.8%). A new diagnosis had been made in 6 patients (3.7%), carcinoma of the stomach in 2, colonic carcinoma in 2, and ulcerative colitis and probable pancreatic steatorrhea in the other 2. One of the cases of colonic carcinoma occurred 6 yr after investigation and was probably incidental. The diagnosis remained unknown in about 33% of all patients while most of the others were considered to suffer from a motility disorder of the bowel (irritable colon or nervous diarrhea).

3546 HAEMATEMESIS AND MELAENA. THE ROYAL MELBOURNE HOSPITAL EXPERIENCE, 1966-1967. (E.) Hardy, K. J. (Repatriation Gen. Hosp., Heidelberg, Victoria, Australia). *Med. J. Aust.* 1(15):785-790, 1971.

In 270 patients with hematemesis, melena or both, 132 had duodenal ulcer, 28 gastric ulcer, 22 acute ulceration and 17 portal hypertension. While the overall mortality rate was 11.8%, 26.5% of the gastric ulcer and 6% of duodenal ulcer patients died. For patients receiving more than 5 units of blood, with a hemoglobin value less than 60% normal, low systolic blood pressure (less than 110 mm Hg) or for whom the diagnosis was gastric ulceration, the prognosis was poor. The safest guard against recurrent bleeding from a duodenal ulcer is a partial gastrectomy with a gastrojejunal anastomosis. Vagotomy plus procedures such as suture of the bleeding point with pyloroplasty and excision of an anterior ulcer is followed by recurrent bleeding in about 10-20% of cases. Thus the hope that vagotomy (being associated with fewer nutritional and dumping syndromes than gastrectomy) would lead to the abandonment of gastrectomy, has not been fulfilled.

3547 THE MEASUREMENT OF CALCIUM ABSORPTION USING AN ORAL AND INTRAVENOUS TRACER. 2. CLINICAL STUDIES. (E.) Shimmins, J. (Western Reg. Hosp. Board, Glasgow, Scotland), D. A. Smith, M. Aitken, G. S. Linsley, J. S. Orr and F. C. Gillespie. *Calcif. Tissue Res.* 6(4): 301-315, 1971.

Equations derived to measure the Ca flow rates in the gastrointestinal tract and blood were applied to data from 23 subjects with various diseases (osteoporosis, osteomalacia, Paget's disease) and who were subjected to different operative procedures (gastroenterostomy, vagotomy Polya gastrectomy and small bowel resection). Absorption occurred all along the small bowel, since relatively normal absorption occurred either when the duodenum was by-passed or when a very large part of the small bowel has been resected leaving only the duodenum and 6 inches of jejunum. The great majority of Ca-absorption occurred within 2 hours of Ca injection (5 µC^{45}Ca i.v. and 20 µC^{47}Ca p.o.). The use of plasma occupancy is apparently of limited use in the study of total dietary Ca absorption. However, fractional secretion into the gastrointestinal tract, i.e. the ratio of fecal occupancy of the i.v. tracer to fecal occupancy of the p.o. tracer was not dependent on the carrier given with p.o. dose and was a constant figure. Since the amount of p.o. tracer excreted in the feces depended on the p.o. tracer carrier, it appears that the feca excretion of the i.v. tracer was also increased when the p.o. tracer carrier was increased. The constant value of the above fraction supports th assumption that the endogenous secretion mixes with the dietary Ca before absorption takes plac

3548 CARCINOMA OF THE STOMACH, COLON, AND RECTUM. A SURVEY OF 772 SURGICAL BIOPSIES FROM MALAYA. (E.) King, M. S. (U. Malaya, Kuala Lumpur, Malaysia) and M. K. Kutty. *Br. J. Surg.* 58(2):123-216, 1971.

Biopsy material obtained from Malaysian patients with carcinoma of the stomach, colon, and rectum were studied to establish the relative racial frequencies in the hospital population. The frequency of gastric carcinoma was about equal in all races (Chinese, Indian, Malay). The ratios of peptic ulcer to gastric carcinoma were Chinese, 4:8; Indian 3; and Malay, 3.7, the differences between groups not being statistical significant. The ratio of carcinoma of the stomach to colonic carcinoma of all races combined was 1.7:1. In each race, carcinoma of the colon was relatively more important in women when the ratio of carcinoma of the stomach/carci of the colon was considered in both sexes. A low frequency of carcinoma of the colon (and rectum) was found in Indians, the ratio of carcinoma of stomach to colon being 2.6:1 compared with 1.6:1 in the Chinese. The Indians had relatively more poorly differentiated and anaplastic tumors of the colon and rectum than the Chinese and Malays.

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PARASITOLOGY

3596 ALTERATIONS OF THE INTRAHEPATIC VASCULATURE IN HEPATOSPLENIC SCHISTOSOMIASIS MANSONI. (E.) Andrade, Z. A. (Fed. U. Bahia Sch. Med., Salvador, Brazil) and A. W. Cheever. *Am. J. Trop. Med. Hyg.* 20(3):425-432, 1971.

The hepatic vascular lesions associated with hepatosplenic schistosomiasis were studied by making vinylite casts of the intrahepatic vessels of cadavers infected with Schistosoma mansoni. The observed portal lesions were predominantly obstructive and appeared to be more frequent near the periphery of the liver, although marked reduction in the portal bed was noted throughout the liver. In cases of hepatosplenic schistosomiasis there was an increase in the number and size of intrahepatic arterial branches which may explain the maintenance of normal blood flow observed in many patients with this disease. Obstructive portal lesions seemed to be the principal cause of portal hypertension in hepatosplenic S. mansoni. Since portal hypertension and Symmers' fibrosis are both usually associated with schistosomiasis, there seems to be a common or interrelated pathogenesis for the 2 complications.

3597 HYCANTHONE RESISTANCE: DEVELOPMENT IN Schistosoma mansoni. (E.) Rogers, S. H. (Johns Hopkins U. Sch. Hyg. Public Health, Baltimore, Md.) and E. Bueding. *Science* 172(3987):1057-1058, 1971.

After the administration of the antischistosomal drug hycanthone to hamsters and mice infected with Schistosoma mansoni, live worms were found mostly in the mesenteric veins. Approximately 6-12 months later these parasites resumed production of viable eggs that gave rise to schistosomes that were resistant to hycanthone. These hycanthone-resistant schistosomes also exhibited cross resistance to 2 chemically related antischistosomal compounds, lucanthone and an aminoalkyl tetrahydroquinolone. For 3 subsequent generations of worms, this drug resistance remained stable. It seems possible that hycanthone-resistant oocytes are induced or selected by this drug. Since hycanthone has been found to be a potent mutagen, administration of this compound might contribute to an increase in the drug resistant oocyte population.

3598 HEPATIC DISTOMIASIS. COURSE ENDING WITH JAUNDICE DUE TO PARASITE OBSTRUCTION. (Sp.) Sarria Diaz, M. (Malaga, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(6):697-700, 1971.

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MAY 1971
VOLUME 6, NO. 5
3601–4500

[illegible] U. OF I. [illegible]

Volume 6, No. 5 Abstracts and Citations Nos. 3601-4500

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the

National Institute of Arthritis and Metabolic Diseases

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington D. C. 20402. Subscription price per year in the United States, Canada, and Mexico, $16.00; foreign, $4.00 additional; and $1.25 for a single copy. Payment is required in advance, and check or money order should be made payable to the Superintendent of Documents.

NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus.* For journals not covered by *Index Medicus,* the abbreviations (with some modifications) found in *World Medical Periodicals,* 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
BSP	sulfobromophthalein
C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
µg	microgram(s)
hr	hour(s)
i.m.	intramuscular
i.p.	intraperitoneal
IU	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
LDH	lactic acid dehydrogenase
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
µM	micromolar
mC,µC	milli-,microcurie(s)
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
MTD	maximum tolerated dose
NAP	nicotanamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotide phosphate
NADPH	reduced nicotinamide adenine dinucleotide phosphate
ng	nanogram (10^{-9})
pg	picogram (10^{-12})
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes), red blood count
resp.	respectively
Rev.	review (only in citations)
RNA	ribonucleic acid
s.c.	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
U	unit(s)
UV	ultraviolet
WBC	white blood cells (leukocytes), white blood count
yr	year(s)

PRE-CLINICAL SCIENCES

MORPHOLOGY, CELLULAR STRUCTURE AND HISTOCHEMISTRY

3601 FINE STRUCTURAL LOCALIZATION OF ACYLTRANSFERASES. THE MONOGLYCERIDE AND α-GLYCEROPHOSPHATE PATHWAYS IN INTESTINAL ABSORPTIVE CELLS. (E.) Higgins, J. A. (Yale Sch. Med., New Haven, Conn.) and R. J. Barrnett. *J. Cell Biol.* 50(1):102-120, 1971.

The fine structural localization of the acyltransferases of the monoglyceride and α-glycerophosphate pathways for triglyceride synthesis was studied in the intestinal absorptive cell. Diglyceride and triglyceride were synthesized from monopalmitin and palmityl CoA in glutaraldehyde-fixed tissue while parallel morphological studies revealed the appearance of lipid droplets in the smooth endoplasmic reticulum. Glutaraldehyde-fixed tissue also synthesized triglyceride from α-glycerophosphate, even though this enzyme system was more fixation-susceptible than the monoglyceride pathway acyltransferases. With the use of cytochemical methods for the localization of free CoA, the monoglyceride pathway acyltransferases were seen to be located primarily on the inner surface of the smooth endoplasmic reticulum. In contrast, the α-glycerophosphate pathway acyltransferases were localized primarily on the rough endoplasmic reticulum. Both enzyme pathways had activity limited to the outer cisternae of the Golgi membranes. In view of the foregoing results, probable intestinal absorptive cell organization, in regard to lipid absorption, was postulated.

3602 THE FINE-STRUCTURAL ORGANIZATION OF THE BRUSH BORDER OF INTESTINAL EPITHELIAL CELLS. (E.) Mukherjee, T. M. (Inst. Med. Vet. Sci., Adelaide, Australia) and L. A. Staehelin. *J. Cell Sci.* 8(3):573-599, 1971.

Freeze-etching of the brush border of mouse intestine epithelial cells revealed the plasma membrane as consisting of a continuous layer, possibly a predominantly lipid bilayer that is split during the cleaving process, in which numerous particles (5-9 millimicrons in diameter) are embedded. Other particle-like substances appeared to be protruding from the true outer membrane surface. Following chemical fixation, the mucopolysaccharide coat of the microvilli appeared either as a generalized surface fuzz or as a thick meshwork of fine filaments: 2 different filament systems were demonstrated inside each microvillus. The grouping of the usually straight-core microfilaments (consisting of subunits with a center to center spacing of 6 millimicrons) into closely-packed, regularly spaced and cross-linked bundles of filament and their extension into the tips of the microvilli suggest that one of their primary functions is to support and maintain the microvillous structure. The similarity of the core microfilaments to action and the disposition of the different types of filaments with respect to the microvillous plasma membrane indicates the possible involvement of the filaments in microvillous contraction.

3603 ULTRASTRUCTURAL CHANGES IN HEPATOCYTES INDUCED BY A STEROID CARBONITRILE. (E.) Garg, B. D. (U. Montreal Inst. Med., Canada), K. Kovacs, J. A. Blascheck and H. Seyle. *Folia Endocrinol. (Roma)* 23(4):357-363, 1970.

Hepatocytes in 3β-hydroxy-20-oxo-5-pregnene-16α-carbonitrile (PCN)-treated rats were swollen, and their cytoplasm slightly vacuolated. Lipid content increased, while glycogen granules decreased in the centroacinal hepatocytes. At 5 days the smooth membranes of the endoplasmic reticulum were strikingly increased and the round or oval smooth-walled sacs were dilated and occupied a larger area of the cytoplasm. After degranulation the long rough endoplasmic reticulum cisternae appeared as smooth lamellae, and were predominantly found in the perinuclear region. Most of the rough endoplasmic reticulum were disorganized. Mitochondria were generally normal, bile canalicula were dilated, and microvilli were hypertrophied. The number of lipid droplets (usually medium to large in size and especially osmiophilic at the periphery) were increased. The proliferation of the smooth endoplasmic reticulum may represent microsomal enzyme induction for drug detoxication.

3604 THE MOLECULAR SIZE OF HUMAN INTRINSIC FACTOR IN GASTRIC JUICE. (E.) Hippe, E. (Bispebjerg Hosp., Copenhagen, Denmark). *Scand. J. Clin. Lab. Invest.* 27(4):337-339, 1971.

The size of the intrinsic factor-^{57}Co-cyanocobalamin complex was determined by Sephadex G-200 gel filtration under conditions similar to those occurring in the stomach: in gastric juice at 37°C pH 1.7 or pH 7.0. The stokes radius of 3.3 millimicrons found in the present study, gave a diffusion constant for the complex of 6.5×10^{-7} cm^2/sec. By applying this value, and known values for the sedimentation constant and partial specific volume, the molecular mass of intrinsic factor was calculated to be 57,000 daltons. Apparently the human intrinsic factor is in the monomer form in gastric juice.

3605 AN ULTRASTRUCTURAL STUDY OF TYZZER'S DISEASE IN THE MONGOLIAN GERBIL (Meriones unguiculatus). (E.) Port, C. D. (U. Chicago Dept. Pathol., Ill.), W. R. Richter and S. M. Moize. *Lab. Invest.* 25(1):81-87, 1971.

The livers of 4 Mongolian gerbils with Tyzzer's disease were examined under the light and electron microscope. Areas of focal necrosis characteristic of this disease were prominent and contained mesenchymal cells, degenerating hepatocytes and polymorphonuclear leukocytes. Bacillus piliformis, the organism responsible for this disease, was found intracellularly with the hepatocyte cytoplasm in close association with the bacterial cell wall. In those hepatocytes that contained organisms, the cytoplasmic granules were few or absent, the endoplasmic reticulum was disorganized and vacuolated and cytoplasmic filaments were seen. These degenerative changes imply that the infected hepatocyte was acted upon by the bacterium or its products. The lack of cellular response such as focal cytoplasmic degradation and the massive depletion of organelles in the cell suggest a severe degenerative process.

3606 CONSIDERATIONS ON THE MUSCULARIS MUCOSAE AND ITS RELATIONS WITH VEINS AT THE ESOPHAGOGASTRIC TRANSITION ZONE. (E.)

Ferraz de Carvalho, C. A. (U. Sao Paulo Sch. Med., Brazil). *Acta Anat. (Basel)* 78(4):559-573, 1971.

The muscularis mucosae, with respect to the lower esophagus, was arranged in 34 individuals like a tridimensional net of very elongated lozenge meshes. The greater thickness of the muscularis mucosae of the lowermost part of the esophagus and also the fine fasciculation of this layer probably has an important influence upon the circulation of the remarkable contingent of veins with which they have a close relationship. The muscularis presented more concentrated bundles at the base of the mucosal folds and more scattered ones in the deep parts, which was another morphofunctional expression of the control that the muscle bundles must have over the veins. The veins in the gastric part of the esophagogastric transition zone showed connections limited with muscle bundles belonging to the muscularis mucosae or the tunica muscularis, and these connections when present, were made through the elastic collagenous system of the tela submucosa of that part. The thick muscularis mucosae may be important in the regulation of the portocaval blood flow at this level of the digestive system.

3607 THE CYTOCHEMICAL LOCALIZATION OF LYSOZYME IN PANETH CELL GRANULES. (E.)

Ghoos, Y. (St. Rafael Acad. Hosp., Leuven, Belgium) and G. Vantrappen. *Histochem. J.* 3(3): 175-178, 1971.

Based on the fact that the breakdown products of the hydrolysis of chitin by lysozyme stain with Alcian blue, a method for the histochemical demonstration of lysozyme activity in the Paneth granules of mice and rats was developed using chitin as substrate for lysozyme. When this technique was applied to the jejunal crypts of several animal species, Paneth cell granules of rats and mice were shown to have lysozyme. Cats and dogs which are devoid of Paneth cells failed to show lysozomal activity.

3608 AN ULTRASTRUCTURAL STUDY OF THE EFFECT OF NEOMYCIN ON THE COLON IN THE HUMAN SUBJECT AND IN THE CONVENTIONAL AND THE GERM-FREE MOUSE. (E.)

Aluwihare, A. P. R. (Roy. Coll. Surg. England, London). *Gut* 12(5):341-349, 1971.

Following intragastric administration of neomycin, the lamina propria of the colon of germ-free mice showed a rapid reduction in the number of lymphocytes, plasma, and other inflammatory cells. These changes were apparently due to alterations in bacterial flora and not a direct toxic effect of neomycin. The distention of endoplasmic reticulum in plasma cells may be the result of a similar action to that of the drug on bacterial ribosomes. Signs of epithelial damage were seen both in conventional and treated gnotobiotic mice and must therefore be a direct toxic result of the drug. Although studies of mitotic counts revealed increased cell turnover time in treated conventional mice, there was no change when the gnotobiotes were treated. Results very similar to those of mice were found in specimens of human colon. The epithelial cell vacuolization, increase in cecal size, and fecal fluidity may be due to a disturbance in water absorption. It is suggested that the use of antibacterial agents prior to colectomy for purposes of inducing colonic antisepsis should be reevaluated in view of the fact that these agents may be responsible for lowering the antipathogenic resistance of the host through interference with the fecal flora.

3609 COMPARATIVE ANATOMY OF FELINE AND CANINE GASTRIC SLING FIBERS. ANALOGY TO HUMAN ANATOMY. (E.)

Friedland, G. W. (Stanford U. Sch. Med., Calif.), S. Kohatsu and K. Lewin. *Am. J. Dig. Dis.* 16(6):495-507, 1971.

The anatomy of the gastric sling fibers was studied in 22 dogs and 16 cats and compared with that reported in humans. In both dogs and cats it was demonstrated that the gastric sling fibers hooked around the notch between the distal esophagus and gastric fundus and traversed the stomach, anteriorly and posteriorly, parallel to the lesser curvature before disappearing near the incisura angularis. In both species there was identified another constant muscle bundle, the constrictor cardiae which encircled the gastric esophageal orifice and merged imperceptibly with the sling fibers in the aforementioned notch. Interspecies differences were observed in the muscularis propria of the distal esophagus which is striated in the dog and smooth in the cat. A "vestibule" at the distal end of the esophagus was found only in the cat. The anatomy of this region in the cat seemingly resembles that of man and would therefore provide a better model than that of the dog.

3610 HISTOLOGICAL CHANGES IN THE SMALL INTESTINE TRANSPLANTED SUBCUTANEOUSLY. (Rus.) Berlin, L. B. (S. M. Kirov Milit. Med. Acad., Leningrad, USSR) and V. F. Zhupan. *Biull. Eksp. Biol. Med.* 71(3):109-110, 1971.

3611 MORPHOLOGIC AND HISTOCHEMICAL CHANGES IN THE LIVER DURING EXPERIMENTAL REGIONAL PERFUSION. (Rus.) Kapustin, R. F., E. Y. Shtitsko and G. I. Kravtsova. *Zdravookhr. Beloruss.* 15(12):17-21, 1970.

3612 EFFECTS OF SALICYLATES ON THE GASTRIC MUCOSA AS REVEALED BY ROENTGEN EXAMINATION AND THE GASTROCAMERA. (E.) Edmar, D. (Sahlgrenska Hosp., Gothenburg, Sweden). *Acta Radiol. [Diagn.]* 11(1):57-64, 1971.

3613 HEPATIC COLLAGEN FRACTIONS IN RAT LIVER. (Jap.) Morotomi, I. (Kyushu U., 3rd Dept. Intern. Med., Fukuoka, Japan). *Seikagaku (J. Jap. Biochem. Soc.)* 43(1):12-22, 1971.

3614 THE LYMPHATIC DRAINAGE OF THE ANAL MARGIN. (E.) Hardy, K. J. (Repatriation Gen. Hosp., Heidelberg, Victoria, Australia). *Aust. NZ J. Surg.* 40(4):367-369, 1971.

3615 NUCLEAR CHANGES IN MOUSE HEPATOCYTES CAUSED BY α-AMANITINE. (Fr.) Meyer-Schultz F. (Inst. Chem. Biol., Strasbourg, France) and A. Porte. *Cytobiologie* 3(3):387-400, 1971.

3616 AN ULTRASTRUCTURAL STUDY OF THE EFFECTS OF FLUOROACETATE ON HEPATOCYTES. (E.) Yates, R. D. (U. Texas Med. Branch, Galveston) and J. C. Yates. *Z. Zellforsch. Mikrosk. Anat.* 117(1):65-72, 1971.

3617 LIGHT AND ELECTRON MICROSCOPE OBSERVATIONS ON THE GASTRIC MUCOSA OF THE FROG (Rana esculenta). I. NORMAL STRUCTURE. (E.) Geuze, J. J. (State U. Med. Fac., Utrecht, Netherlands). *Z. Zellforsch. Mikrosk. Anat.* 117(1):87-102, 1971.

3618 LIGHT AND ELECTRON MICROSCOPE OBSERVATIONS ON THE GASTRIC MUCOSA OF THE FROG (Rana esculenta). II. STRUCTURAL ALTERATIONS DURING HIBERNATION. (E.) Geuze, J. J. (State U. Med. Fac., Utrecht, Netherlands). *Z. Zellforsch. Mikrosk. Anat.* 117(1):103-117, 1971.

3619 PATHOMORPHOLOGICAL, ELECTRON MICROSCOPIC AND ENZYME HISTOCHEMICAL CHANGES IN THE SMALL INTESTINAL MUCOSA IN PATIENTS WITH FOOD ALLERGY. (Bul.) Krasteva, A. *Vatr. Bolesti* 9(4):15-23, 1970.

3620 SCANNING ELECTRON MICROSCOPY OF THE NORMAL HUMAN COLON. PRELIMINARY COMMUNICATION. (E.) Crucioli, V. (Rome 2nd. Med. Clin.), A. Torsoli and F. Pallone. *R.C. Rom. Gastroenterol.* 2(3):184-188, 1970.

3621 HISTOCHEMICAL INVESTIGATIONS OF HUMAN GASTRIC MUCOSA. (Pol.) Kalina, Z. (Slaskiej Med. Acad 1st Clin. Intern. Dis., Katowice, Poland), J. Jonek and S. Tokarz. *Pol. Tyg. Lek.* 26(2):48-51, 1971.

See also numbers: 3626, 3667, 3695, 3715, 3750, 3792, 3803, 3909, 3911, 4022

3622 THE SUBCELLULAR DISTRIBUTION OF ORALLY ADMINISTERED ^{59}Fe IN RAT SMALL INTESTINAL MUCOSA. (E.) Worwood, M. (Welsh Natl. Sch. Med. Cardiff) and A. Jacobs. *Br. J. Haematol.* 20(6): 587-597, 1971.

A high absorption of ^{59}Fe in rat small intestine mucosa was achieved by giving a small dose (5 μC) as ferric chloride in hydrochloric acid. Up to 4 hr after administration of this dose, about 50% of ^{49}Fe in the mucosal homogenates was present in the soluble fraction. At 12 and 18 hr the relative specific activity patterns were very similar to that of succinate dehydrogenase indicating large mitochondrial concentrations of ^{59}Fe. The ^{59}Fe activity precipitated from the mucosal homogenates by the anti-ferritin serum increased from 31% at 15 min to 74% at 4 hr; however at 12 and 18 hr, relatively little mucosal ^{59}Fe that was present during the early phase of absorption was present in a high molecular weight non-ferritin form. The absorptive capacity of the intestinal cell for Fe is determined by the amount of Fe incorporated by the young cells in the crypts of Lieberkuhn and much of this Fe may be incorporated into mitochondria.

3623 EFFECT OF FATS IN THE FOOD ON THE ABSORPTION OF AMINOACIDS IN THE RAT SMALL INTESTINE. (E.) Cieślak, D. (Inst. Food Nutr., Warsaw, Poland), S. Ziemlański and M Pałaszewska. *Acta Physiol. Pol.* 21(5):566-572, 1970.

Heated soybean oil was fed to rats for 4-15 weeks. Everted small intestine sacs from these rats showed decreased amino acid absorption. Nonheated soybean oil for 4 weeks, but not after 15 weeks, increased the absorption of amino acids. Nonheated lard, and both heated and nonheated Palma margarine, given to rats for 15 weeks, significantly decreased the amino acid absorption. It is suggested that the decreased absorption of amino acids in the case of administration of food with heated soybean oil may be associated with thermal oxidation of unsaturated fatty acids present in this oil.

3624 DETERMINANTS OF INSULIN RESPONSE TO GLUCOSE ABSORPTION FROM HUMAN SMALL BOWEL. (E.) Blum, A. L. (Lemuel Shattuck Hosp., Boston, Mass.) and W. G. Linscheer. *Metabolism* 20(7):666-671, 1971.

A segmental intestinal perfusion technique was used to examine the relationship between rate of glucose absorption, rise of serum glucose and rise of serum insulin in man. Significant path coefficients, derived from a model of causal paths, were found for the direct effect of glucose absorption on serum glucose and serum insulin and for the feedback mechanism between serum insulin and serum glucose. Despite a fall in the rate of absorption along the upper small bowel, the relative response of insulin did not depend on the site of glucose absorption and was also independent of the tonicity of luminal contents. The insulin response persisted after termination of glucose absorption for at least 1 hr. Exocrine pancreatic secretion (amylase or volume output) was not stimulated during absorption of glucose. With respect to the above results, secretin may be the hormone which augments the insulin response to glucose absorbed from the small bowel.

3625 INTESTINAL ABSORPTION OF TRIGLYCERIDE AFTER TRUNCAL VAGOTOMY IN THE DOG. (E.) Inberg, M. V. (U. Turku Dept. Surg., Finland), J. Ahonen, T. Havia and T. M. Scheinin. *Acta Chir. Scand.* 137(4):361-365, 1971.

For the purposes of studying the effect of truncal vagotomy on small intestine fat absorption, intraduodenal administration of tritiated triolein in both vagotomized and control dogs was followed by measurement of its recovery in thoracic duct lymph (cisterna chyli). Truncal vagotomy did not result in decreased fat absorption under these experimental conditions. With the experimental technique used, the fat was introduced directly into the duodenum in order to provide equal and adequate conditions for absorption, and cholecystokinin-pancreozymin was used for maximal stimulation of biliary-pancreatic secretion. The main advantage of this experimental procedure is the possibility of examining the small intestine absorption capacity under conditions of maximal stimulation of gallbladder emptying and pancreatic secretion.

3626 SMALL INTESTINAL ABSORPTION OF HORSERADISH PEROXIDASE. A CYTOCHEMICAL STUDY. (E.) Cornell, R. (Harvard Med. Sch., Boston, Mass.), W. A. Walker and K. J. Isselbacher. *Lab. Invest.* 25(1):42-48, 1971.

Transmittance of macromolecules across the rat small intestinal mucosa was studied cytochemically by means of horseradish peroxidase as a marker. Horseradish peroxidase (5 mg/ml of normal saliva) was injected into a ligated segment of jejunum or ileum of the adult albino rats. The animals were sacrificed 1 to 5 hr after injection. The marker was found adsorbed to the apical surface membrane and within cytoplasmic canalicular, vesicular and vacuolar structures. Absorbed marker was also found in the intercellular spaces between adjacent absorption cells and in the connective tissue space of the lamina propria. These results indicate that membranous subcellular systems within the rat small intestinal absorptive cell are capable of taking up exogenous macromolecules and can transmit these macromolecules to the extracellular space of the lamina propria. It is possible that the above principles of macromolecular transmission across the small intestine mucosa can be applied to enhance absorption of therapeutic large molecular weight substances such as peptide hormones and drugs.

3627 MECHANISM OF ACTION OF 1,25-DIHYDROXYCHOLECALCIFEROL ON INTESTINAL CALCIUM TRANSPORT. (E.) Tanaka, Y., H. F. DeLuca (U. Wisconsin Coll. Agric. Life Sci., Madison), J. Omdahl and M. F. Holick. *Proc. Natl. Acad. Sci. USA* 68(6):1286-1288, 1971.

The presence of actinomycin D was responsible for the inhibition of metabolism of 25-hydroxycholecalciferol to 1,25-dihydroxycholecalciferol (a compound able to initiate intestinal Ca transport). Intestinal Ca transport response to 1,25-dihydroxycholecalciferol was not blocked by actinomycin D while the Ca transport response to 25-hydroxycholecalciferol was blocked by this drug. The dihydroxy compound, or a further metabolite thereof, seems to be the metabolically active form of vitamin D_3 in the intestine. These results suggest that the monohydroxy compound is the precursor of the metabolically active form of vitamin D in the intestine. Since the dihydroxy compound can initiate intestinal Ca transport in the presence of actinomycin D, the transcription of DNA into RNA is apparently not involved in vitamin D_3 action, once the correct, metabolically active, form of the vitamin is provided. 25-Hydroxycholecalciferol probably induces the formation of an enzyme or enzymes involved in the production of 1,25-dihydroxycholecalciferol.

3628 STUDIES ON CALCIFEROL METABOLISM II. TRITIUM LOSS FROM TRITIATED VITAMIN D_3 AND THE POSSIBLE STRUCTURE OF THE PROPOSED NUCLEAR REGULATOR OF INTESTINAL CALCIUM TRANSPORT. (E.) Myrtle, J. F. (U. California Dept. Biochem., Riverside) and A. W. Norman. *Steroids* 17(6): 619-630, 1971.

Studies of the metabolism of mixed doses of specifically labeled ^3H- and ^{14}C-cholecalciferol offer some indications of the structure of metabolite 4B (the result of cholecalciferol metabolism via a 25-hydroxy intermediate), the proposed nuclear regulator of intestinal Ca transport. Metabolite 4B retained the ^{14}C label at the carbon 4 position, but lost tritium. In 2 of the 3 preparations examined, the formation of metabolite 4B involved the loss of tritium from the 1-α position; in the third preparation, the loss corresponded closest to the 1-β tritium. Two preparations of 1,2-^3H-cholecalciferol and 1-^3H-cholecalciferol clearly lost only 1 of the carbon-1 tritiums. The formation of metabolite 4B probably involves the addition of a single oxygen function to 25-hydroxycholecalciferol.

3629 MOLECULAR FACTORS IN ANTRAL PERMEATION: THEIR PROPOSED ROLE IN GASTRIN RELEASE. (E.) Berkowitz, J. M. (Nassau County Med. Ctr. Dept. Med., East Meadow, N. Y.), G. Buetow, M. Walden and M. Praissman. *Am. J. Physiol.* 221(1): 259-265, 1971.

Antral permeability to glycine, ethanol, ethanolamine, choline, and acetylcholine was determined at pH 7 and 1 in dogs with vagally denervated antral pouches. The loss of glycine, ethanolamine, choline and acetylcholine from the pH 7 solution always exceeded the loss from the pH 1 solution. At pH 7, the antrum was very permeable to ethanol, less permeable to glycine, ethanolamine, and acetylcholine and hardly permeable to choline. None of the compounds, but ethanol, easily penetrated the mucosa at pH 1. Sodium and all of the above compounds permeated a synthetic membrane, containing weak acidic groups, 2-3 times faster at pH 7 than at pH 1, except for ethanol which did not change. The decline in antral permeability to cations at pH 1 is apparently the result of the loss of fixed anionic groups. The pH-dependent change in cation permeability could be one mechanism by which acid in the antrum inhibits gastrin release.

3630 FACTORS INFLUENCING HEMOSIDEROSIS. THE ROLE OF IRON ABSORPTION. (E.) Doberneck, R. C. (U. New Mexico Sch. Med., Albuquerque). *Am. J. Surg.* 122(1):33-35, 1971.

The ability of the liver to absorb iron was studied in dogs with various degrees of gastrectomy. Hepatic hemosiderin increased minimally in 2 of 7 dogs after 50% gastrectomy and in 1 of 5 dogs after 75% gastrectomy and increased markedly in only 1 of 9 dogs following 95% gastrectomy. The mean rib marrow space occupied by fat declined moderately after 50% gastrectomy, but increased markedly and moderately following 75 and 95% gastrectomy, resp. Weight loss was marked only after 95% gastrectomy. Mean serum Fe concentration and mean Fe-binding capacity declined in nearly parallel fashion after both 50 and 75% gastrectomy, but rose insignificantly after 95% gastrectomy. Weight loss, diminished erythropoiesis, and hemosiderosis are not absolutely correlated, and in the absence of an adequate mechanism for Fe absorption, hemosiderosis does not occur despite marked weight loss and diminished erythropoiesis.

3631 ABSORPTIVE STUDIES IN CANINE JEJUNAL ALLOGRAFTS. (E.) Holmes, J. T., S. D. J. Yeh, S. J. Winawer, N. Kawano and J. G. Fortner (Sloan-Kettering Inst., New York, N. Y.). *Ann. Surg.* 174(1):101-108, 1971.

Investigations were made on the absorptive properties of canine jejunal allografts. Six months after isolation of Thiry-Vella loops in control dogs, these loops continued to remain pink, continued to secrete clear fluid, and exhibited normal peristalsis and undisturbed absorption. The average survival time of 4 canine jejunal allografts without immunosuppression was 8 days. The first change at 4 or 5 days was a steadily increasing infiltrate of lymphocytes and plasma cells, followed very rapidly by villous and crypt necrosis. The average survival time of allografts in 12 dogs receiving immunosuppression therapy (azathioprine and prednisolone) was 24.6 days. Glucose absorption in the allografts was initially the same as in control Thiry-Vella loops but as rejection (shrinkage, fibrosis, necrosis) proceeded, ^{14}C-glucose recovery from the loop rose only slightly while plasma ^{14}C levels remained constant. Histological rejection was advanced and virtually complete before any change was observed in glucose absorption. It is suggested that these jejunal walls which were fully permeable to glucose may have been influenced by secondary bacterial infection. It was concluded that biopsy and histological examination are much more valid tests of jejunal transplant function than glucose absorption.

3632 EFFECT OF LUMINAL pH ON THE ABSORPTION OF WATER, Na$^+$ AND Cl$^-$ BY RAT INTESTINE *IN VIVO*. (E.) Rousseau, B. (Notre-Dame Hosp., Montreal, Quebec, Canada) and G. E. Sladen. *Biochim. Biophys. Acta* 233(3):591-593, 1971.

In *in vivo* studies of rat ileal loops, appreciable absorption of water, Na$^+$ and Cl$^-$ was found to take place using HCO$_3^-$ buffered solution at pH 7.6. However, from solutions at pH 6.6 and 5.6, the absorption rates of water and Na$^+$ were not significantly different from zero, while Cl$^-$ absorption was also significantly reduced. At pH 7.6, replacement of HCO$_3^-$ by phosphate did not alter mean absorption rates of Na$^+$ or Cl$^-$, although the mean water absorption rate was greater. In *in vivo* studies of the rat colon, maximal absorption rates of water, Na$^+$ and Cl$^-$ took place from solutions of pH 6.6, irrespective of the presence of HCO$_3^-$ or phosphate. Water and Na$^+$ absorption was negligible from the solution of pH 4.2, although significant Cl$^-$ absorption occurred. Reduction of luminal pH does inhibit the net absorption of water, Na$^+$ and Cl$^-$ from rat ileum and colon. Apparently, Na$^+$ absorption provides the main drive for water movement out of the lumen.

3633 INHIBITION OF THE INTESTINAL ABSORPTION OF INORGANIC AND HEMOGLOBIN IRON BY CHOLESTYRAMINE. (E.) Thomas, F. B., F. S. McCullough and N. J. Greenberger (Ohio State U. Hosp., Columbus). *J. Lab. Clin. Med.* 78(1): 70-80, 1971.

Cholestyramine, an anion-exchange resin known to bind bile salts, thyroxine and digitalis glycosides, bound 13-75% of available ^{59}FeSO$_4$ in *in vitro* preparations with binding being pH-dependent (5.0-7.0). Cholestyramine bound 60-76% of available hemoglobin-^{59}Fe *in vitro*, but in this case binding was less pH-dependent. In rats pretreated (1 hr) with cholestyramine (100 mg), significantly less ^{59}FeSO$_4$ was absorbed as compared to controls. Following phlebotomy, absorption of ^{59}FeSO$_4$ was markedly increased; however, cholestyramine pretreatment again led to a decreased absorption. Cholestyramine also depressed ^{59}FeSO$_4$ absorption in iron dextran-loaded rats. Prior bleeding caused approximately a 5-20-fold increase in the absorption of hemoglobin ^{59}Fe as compared to normal nonbled controls, but this increase in absorption could be attenuated by cholestyramine pretreatment. Cholestyramine inhibited absorption of ^{59}FeSO$_4$ in normal, bled, and iron-loaded rats and diminished the intestinal absorption of hemoglobin ^{59}Fe in anemic rats.

3634 OBSERVATIONS ON IRON IN THE JEJUNAL LUMEN AFTER A STANDARD MEAL. (E.) Glover, J. (Welsh Nat. Sch. Med., Cardiff) and A. Jacobs. *Gut* 12(5):369-371, 1971.

The mean total Fe content of human jejunal juice rose following the ingestion of a standard test meal. Immediately after the meal there was a rise in the amount of large molecular weight Fe in the jejunal contents but as time progressed there was a gradual increase in the concentration of low molecular weight iron compounds. This suggests that the transfer of Fe from the mucopolysaccharide carrier is taking place within the lumen of the gut. The chemical form of Fe being presented to the epithelial cells of the small intestine is at least partly a low molecular weight iron complex, and considerations of intraepithelial mechanisms of absorption should take this into account.

3635 ABSORPTION AND METABOLISM OF L-DOPA BY THE HUMAN STOMACH. (E.) Rivera-Calimlim, L. (U. Rochester Sch. Med., Dent., N. Y.), C. A. Dujovne, J. P. Morgan, L. Lasagna and J. R. Bianchine. *Eur. J. Clin. Invest.* 1(5):313-320, 1971.

Patients with Parkinson's disease having alkaline gastric juice showed very rapid gastric emptying of L-Dopa and no demonstrable gastric absorption compared to patients with acid gastric juice. Patients treated with antacids revealed a significantly reduced gastric emptying time, and gastric absorption was lower following treatment than before. Peak serum concentrations were higher and more rapidly achieved in patients with high gastric pH than in those with low pH, e.g. patients with partial gastrectomy and those who were given the drug by duodenal infusion. An *in vitro* study of human stomach tissue suggested that direct absorption of L-dopa by the stomach may be limited by gastric metabolism of the drug. Gastric emptying time was inversely related to serum L-dopa levels suggesting that the intestine was the major absorptive site.

Factors prolonging gastric emptying time may lower serum levels of L-dopa by delaying access of the drug to the site of absorption and by increasing metabolism before absorption.

3636 BINDING CAPACITY OF INTESTINAL MUCOSA AND BLOOD PLASMA FOR ZINC. (E.) Suso, F. A. (U. Georgia Poultry Sci. Dept., Athens) and H. M. Edwards, Jr. *Proc. Soc. Exp. Biol. Med.* 137(1):306-309, 1971.

After p.o., i.m. or i.v. admin. of ^{65}Zn (4.9 mc/mg), dialysis of an intestinal mucosal soluble fraction and blood plasma against distilled water indicated binding of ^{65}Zn to the mucosal and plasma proteins. Since less ^{65}Zn was dialyzable from plasma than from the mucosal soluble fraction, plasma proteins apparently bind Zn to form stronger complexes than mucosal proteins. This probably facilitates the removal of the Zn from the mucosal lining into the blood capillary system, thus completing the process of absorption. The protein from the mucosal soluble fraction which bound the Zn had a greater elution time than plasma albumin, thus indicating a smaller size. However, the solubility properties seemed to indicate that the Zn-binding protein belonged to the albumin group.

3637 EFFECTS OF HEMORRHAGE AND TILTING ON Na, Cl, AND H_2O ABSORPTION FROM THE INTESTINE. (E.) Mailman, D. S. (U. Houston Dept. Biol. Biophys., Tex.) and R. C. Ingraham. *Proc. Soc. Exp. Biol. Med.* 137(1):78-81, 1971.

Hemorrhage of 6% of the estimated blood volume did not alter the ability of the canine gut to absorb Na or Cl against a concentration difference. Hemorrhage at the 12% level caused a significant decrease in the final Na concentration at 40 min. The final Na concentration remained reduced after reinfusion, suggesting a prolonged effect of hemorrhage. Hemorrhage at the 25% level and upward tilting of the head both caused a significant decrease in the final luminal Na concentration and a significant increase in the volume of H_2O absorbed. It seems that hemorrhage and upward tilting of the head may increase the absorption of Na against a gradient and H_2O through hormonal and/or cardiovascular changes.

3638 EFFECT OF TRANSPORTED SOLUTES ON MEMBRANE POTENTIALS IN BULLFROG SMALL INTESTINE. (E.) White, J. F. (Indiana U. Sch. Med., Indianapolis) and W. M. Armstrong. *Am. J. Physiol.* 221(1):194-201, 1971.

Mucosal and serosal membrane potentials in epithelial cells of isolated bullfrog small intestine were 45 and 49 mv, resp. In both cases the cell interior was negative with respect to the bathing medium. Actively transported solutes: D-glucose, D-galactose and L-valine all significantly decreased the potential difference across the mucosal membrane and increased the serosal positive transmural potential difference. The potential difference across the serosal membrane was also decreased but to a lesser extent than that across the mucosal membrane. L-Sorbose exerted no effect, whereas mucosal phlorizin prevented or reversed the changes induced by glucose or galactose but had no effect on those induced by valine. A mechanism is proposed which describes the effects of actively transported sugars and amino acids on mucosal potential difference and serosal positive transmural potential difference in terms of an increased inward Na$^+$ current across mucosal membrane and attenuation of the resulting increase in serosal positive transmural potential difference due to the existence of extracellular ionic shunts.

3639 STEROL ABSORPTION - FROM LUMEN TO LIVER. (E.) McIntyre, N. (Roy. Free Hosp., London). *Gut* 12(5):411-416, 1971.

In view of the fact that in rat small intestine the micellular sterol pattern is similar to that of sediment (both products of ultracentrifugation of small intestine contents), it is suggested that different sterols have a similar solubility in micelles, and also that sediment sterol is available for absorption. As micellar solution is obligatory for mucosal uptake of sterols, absorption can only take place from the small intestine, preferably the upper small intestine. The mode of transfer of sterols from micelles into mucosa cells and across the epithelial cells is poorly understood at present. Absorbed sterols entering intestinal lymph are mostly present in the unesterified form; esterification in the small intestinal wall apparently results from mucosal cholesterol esterase activity. Cholesterol of intestinal origin is carried in lymph in triglyceride-rich lipoprotein particles which are carried via the thoracic duct to the systemic circulation. About 90% of chylomicron cholesterol is rapidly taken up by the liver. One consequence of excessive absorption of cholesterol is the accumulation by the liver of large amounts of cholesteryl ester. Serum cholesterol levels can be reduced by feeding diets rich in polyunsaturated fatty acids.

3640 INTERACTION BETWEEN THE SUGAR AND AMINO-ACID TRANSPORT SYSTEMS AT THE SMALL INTESTINAL BRUSH BORDER: A COMPARATIVE STUDY. (E.) Robinson, J. W. L. (Canton Hosp., Lausanne, Switzerland) and F. Alvarado. *Pfluegers Arch.* 326(1):48-75, 1971.

Interactions between monosaccharides and amino acids for transport by the small intestine in 5 mammalian species (hamster, mouse, guinea pig, rat and rabbit) were studied. The initial uptake of amino acids by intestinal slices, measured during short term incubations, was inhibited by monosaccharides (including glucose) which are substrates for the sugar transport carrier. In view of the short incubation time, this interaction apparently occurs at the outer face of the brush border membrane. Heterologous counter transport (down a concentration gradient) between monosaccharides and neutral amino acids was demonstrated and the locus of this interaction was practically restricted to the brush border membrane. Whereas quantitative differences between species existed, no important qualitative differences were seen. Results support the hypothesis that monosaccharides and amino acids interact allosterically at the surface of the brush border membrane due to the proximity of their respective binding sites.

3641 ABSORPTION OF SODIUM AND WATER BY HUMAN RECTUM MEASURED BY A DIALYSIS METHOD. (E.) Edmonds, C. J. (Univ. Coll. Hosp. Med. Sch., London). *Gut* 12(5):356-362, 1971.

The Na^+ influx rate (lumen to plasma) measured in the human rectum was about 5 times greater than the Na^+ efflux rate (plasma to lumen), when the luminal solution was of high (145 mEq/liter) Na^+ concentration. For the net Na^+ flux rate to be zero, the luminal Na^+ concentration must generally be about 15 mEq/liter. The potential difference measured at the time of the flux determinations (the luminal Na^+ concentration being about 30 mEq/liter) averaged -26 mv. Apparently the epithelium must possess a powerful Na^+ absorbing pump. The water absorption rate was greater when luminal Na^+ concentration and sodium absorption rate was higher. Water absorption from isotonic solutions depends on active absorption of Na^+ probably by the development of local osmotic gradients within the tissue as suggested for other epithelia.

3642 EFFECT OF ILEAL BYPASS AND ALFALFA ON HYPERCHOLESTEROLAEMIA. (E.) Barichello, A. W. (U. Saskatchewan Dept. Anat., Saskatoon, Canada) and S. Fedoroff. *Br. J. Exp. Pathol.* 52(1):81-87, 1971.

When rabbits were given 300 or 600 mg/day p.o. of cholesterol, serum cholesterol levels were consistently lower in animals with ileal bypass than in intact rabbits. Rabbits with ileal bypass maintained normal serum cholesterol levels when they were given 600 mg/day of cholesterol and 30-100 g/kg/week of alfalfa while rabbits without ileal bypass who were given this dose of cholesterol had to eat 150-250 g/kg/week of alfalfa to maintain normal serum cholesterol levels. These findings support the hypothesis that alfalfa reduces blood cholesterol levels by blocking cholesterol-absorbing sites in the intestinal mucosa, but the decreased amount of cholesterol absorbed by rabbits with ileal bypass might also be due to the shorter intestinal transit time in these animals. However, if alfalfa completely blocked cholesterol-absorbing sites, serum cholesterol levels should have remained normal even with increased doses of cholesterol. The observation that serum cholesterol levels increased with increasing doses of cholesterol could be explained either by incomplete and reversible blocking of cholesterol-absorbing sites or by the formation of a complex between alfalfa and cholesterol which cannot be absorbed from the intestine. Since other work shows a definite relation between cholesterol intake and the amount of alfalfa required to prevent hypercholesteremia, it appears that the second explanation is the correct one.

3643 A SIMPLE METHOD FOR CALCULATING ABSORPTION OF DIETARY CHOLESTEROL IN MAN. (E.) Sodhi, H. S. (U. Saskatchewan Dept. Med., Saskatoon, Canada), L. Horlick, D. J. Nazir and B. J. Kudchodkar. *Proc. Soc. Exp. Biol. Med.* 137(1):277-279, 1971.

After an oral dose of cholesterol-1-2-^3H and β-sitosterol-4-^{14}C, the difference in the $^3H/^{14}C$ ratios between the fed and fecal sterols is a measure of the difference in the absorption of the 2 sterols. The 2 sterols quantitatively and qualitatively undergo identical conversions and degradations in the gastrointestinal tract. Less than 5% of the β-sitosterol is absorbed, whereas, the absorption of cholesterol may be 10 times greater than that of β-sitosterol, the calculation of which can be obtained from the difference in the $^3H/^{14}C$ ratios. The first sample of feces containing the red color of added carmine red marker should be examined since this test sample contains the unabsorbed sterols uncontaminated by radioactivity from the biliary cholesterol and bile acids.

3644 THE PERMEABILITY OF ISOLATED AND IN SITU MOUSE HEPATIC GAP JUNCTIONS STUDIED WITH ENZYMATIC TRACERS. (E.) Goodenough, D. A. (Harvard Med. Sch., Boston, Mass.) and J.-P. Revel. *J. Cell Biol.* 50(1):81-91, 1971.

When used after phospholipase C, the alcian blue-lanthanum method failed to reveal the usual functional specializations (20 Å gap and polygonal lattice of particles) in an isolated hepatic cell membrane preparation. Phospholipase, perfused through the mouse liver in situ had no effect on the morphology of the gap junctions, failing both to collapse the 20 Å gap and to disrupt the polygonal lattice of subunits. Horseradish peroxidase, with physical dimensions similar to those of Clostridium phospholipase, was not found in the gap junctions in the whole tissue, but the enzyme was seen on the cytoplasmic face and in the 20 Å gap of incubated isolated junctions. Beef liver catalase, a much larger molecule than peroxidase, did not penetrate even in isolated fractions. Extracellular phospholipase cannot diffuse into the junctional area, but the enzyme may affect structures within the gap from its cytoplasmic surfaces which become exposed in the isolated preparations.

3645 FAT ABSORPTION IN BILE FISTULA MAN. A MORPHOLOGICAL AND BIOCHEMICAL STUDY. (E.) Porter, H. P., D. R. Saunders (U. Washington Dept. Med., Seattle), G. Tytgat, O. Brunser and C. E. Rubin. *Gastroenterology* 60(6):1008-1019, 1971.

The intestinal contents were analyzed following the feeding of a fatty meal to 6 patients with bile fistulas. The pathway of fat absorption through the jejunal absorptive cells was normal despite the very low concentrations of free fatty acid (0.016-0.046 mM) which were solubilized in the aqueous phase of proximal intestinal contents after a fatty meal. Concentrations of phospholipid and of cholesterol in the aqueous phase of proximal intestinal contents were also abnormally low when bile salts were deficient. Following a low fat meal, there was no difference between the numbers of chylomicrons in the proximal jejunal absorptive cells of bile fistula patients and normal controls. After a high fat meal, however, the difference in the quantity of fat before and after closure of the bile fistula was far more obvious within the proximal jejunal cells. Chylomicrons were more numerous and many were larger in the apical half of the absorptive cells at the tip of the villus after closure of the fistula.

3646 ROLE OF THE COMMON BILE DUCT IN FORMATION OF BILE IN GASTRIN-INDUCED CHOLERESIS. (E.) Nahrwold, D. L. (Milton S. Hershey Med. Ctr., Hershey, Pa.) and A. N. Shariatzedeh. *Surgery* 70(1):147-153, 1971.

Isolated segments of canine common bile duct epithelium were used to study water and electrolyte transfer alone or following administration of gastrin. Results showed a net flux of water and all electrolytes from plasma to the lumen of the isolated segment during tests with bile perfusion. The presence of clear fluid within the collection tubing at the beginning of each experiment indicated that water and electrolyte transfer had occurred across the common bile duct mucosa. There was net transfer of water and all electrolytes from blood to lumen when the duct was perfused with isotonic electrolyte solution, but to a considerably lesser extent than that seen following bile perfusion. The total net flux of water and electrolytes following pentagastrin admin. was approximately twice that obtained in response to perfusion of the electrolyte solution alone. Although the data ascribe a secretory role to the ductal mucosa, the threshold and maximal values for this secretion have not been defined.

3647 HEPATIC TRANSPORT OF IODIPAMIDE IN VARIOUS ANIMAL SPECIES. (E.) Fischer, E. (Univ. Med. Sch., Pecs, Hungary) and F. Varga. *Acta Physiol. Acad. Sci. Hung.* 38(2-3):135-142, 1970.

The hepatic transfer maximum of iodipamide, determined by the single injection method, was highest in rabbits and guinea pigs, lower in rats and lowest in cats and dogs. As the dose of iodipamide was increased, its concentration in bile tended to reach a maximum with the highest levels in the dog (56 mg/ml) and the lowest in the cat and guinea pig (25 mg/ml). Of the amount of iodipamide remaining in the organism, only 14% was in the liver at the time of maximum excretion. To attain maximum excretion in the rat and dog, the liver had to contain at least 1 mg/g of iodipamide. These factors explain why such high doses (600 and 800 mg/kg) had to be given to attain the maximum hepatic transfer. The iodipamide transfer maximum in the various species was not determined primarily by the peak level but by the bile producing capacity of the liver.

3648 SYNTHESIS, INTRACELLULAR TRANSPORT, AND DISCHARGE OF SECRETORY PROTEINS IN STIMULATED PANCREATIC EXOCRINE CELLS. (E.) Jamieson, J. D. (Rockefeller U., New York, N. Y.) and G. E. Palade. *J. Cell Biol.* 50(1):135-158, 1971.

Pancreatic slices from starved male guinea pigs were stimulated in vitro for 3 hr with 0.01 mM carbamylcholine. The acinar lumen profile was markedly enlarged after 1 hr due to insertion of zymogen granule membranes into the apical plasmalemma accompanying granule discharge. Granule population exocytosis was nearly completed between 2 and 3 hr of stimulation, as the luminal profile reverted to unstimulated dimensions. After 3 hr of stimulation degranulation was virtually complete with only a few residual granules still persisting adjacent to the apical plasmalemma. These acinar cells contained a markedly enlarged Golgi complex consisting of numerous stacked cisternae and electron opaque vesicles, and possessed many small pleomorphic storage granules. The rate of protein synthesis, the rate of drainage of the rough endoplasmic reticulum and the overall transit time of secretory proteins through the cells was not accelerated by the secretogogue. Secretory stimuli applied in vitro primarily affect the discharge of secretory proteins and do not, directly or indirectly, influence their rates of synthesis and intracellular transport.

3649 VITAMIN D STIMULATED CALCIUM BINDING PROTEIN FROM RAT INTESTINAL MUCOSA. PURIFICATION AND SOME PROPERTIES. (E.) Drescher, D. and H. F. DeLuca (U. Wisconsin Dept. Biochem., Madison). *Biochemistry* 10(12):2302-2307, 1971.

Vitamin D -stimulated Ca^{+}-binding protein from rat small intestinal mucosa was purified to homogeneity. After the intestinal supernatant was concentrated and directly applied to the

Sephadex G-100 column, a portion of this fraction was applied to a CM-Sephadex column. The elution profile revealed only one Ca$^+$ binding peak. Using a second procedure (gel filtration on Bio-Gel P series resins) a homogenous Ca$^+$ binding protein was demonstrated as well as another protein having a similar charge as the Ca$^+$ binding protein. This isolated protein may be a precursor of the Ca$^+$ binding protein. A sedimentation equilibrium measurement on the binding protein showed a molecular weight value of about 8200.

3650 CALCIUM ABSORPTION AND EXCRETION IN THE GUT IN CHRONIC RENAL FAILURE. (E.) Reiner, M. (Roy. Postgrad. Med. Sch., London), A. Nadarajah and N. J. Y. Woodhouse. *Isr. J. Med. Sci.* 7(3):522, 1971.

3651 EFFECT OF LACTOSE ON THE ABSORPTION OF ALKALINE EARTH METALS AND INTESTINAL LACTASE ACTIVITY. (E.) Fournier, P. (EPHE Study Group Nutr. Factors Ossif., Paris), Y. Dupuis and A. Fournier. *Isr. J. Med. Sci.* 7(3):389-391, 1971.

3652 INFLUENCE OF SODIUM, GLUCOSE AND XYLOSE ON CALCIUM ABSORPTION. STUDIES WITH JEJUNAL PERFUSIONS IN FIVE HUMAN SUBJECTS. (E.) Chapuy, M. C. (Sch. Adv. Stud. Pathol. Lab., Lyon, France) and D. Pansu. *Isr. J. Med. Sci.* 7(3):386-388, 1971.

3653 WATER AND IONIC TRANSPORT BY INTESTINE AND GALLBLADDER. (E.) Edmonds, C. J. (Univ. Coll. Hosp. Med. Sch., London). *Membranes Ion Transplant.* 3:79-110, 1971.

3654 FORM AND PATH OF LONG-CHAIN FATTY ACID INTESTINAL ABSORPTION IN RAINBOW TROUT. I. LIPID PARTICLES. (Fr.) Bergot, P. (Natl. Res. Ctr. Zootechn., Jouy-en-Josas, France) and J. E. Flechon. *Ann. Biol. Anim. Biochim. Biophys.* 10(3):459-472, 1970.

3655 FORM AND PATH OF LONG-CHAIN FATTY ACID INTESTINAL ABSORPTION IN RAINBOW TROUT. II. STELLATE LIPIDS. (Fr.) Bergot, P. (Natl. Res. Ctr. Zootechn., Jouy-en-Josas, France) and J. E. Flechon. *Ann. Biol. Anim. Biochim. Biophys.* 10(3):473-480, 1970.

3656 INTESTINAL RESORPTION OF CYTIDINE ^{14}C AND URIDINE ^{14}C IN THE RAT IN VIVO. (It.) Sciorelli, G. (Univ. Inst. Human Physiol., Pavia, Italy), U. Ventura and G. Grignani. *Boll. Soc. Ital. Biol. Sper.* 45(23):1538-1542, 1970.

3657 INFLUENCE OF THYROIDECTOMY ON INTESTINAL ABSORPTION OF SILICON DIOXIDE AND THE BLOOD SILICON DIXOIDE LEVEL IN THE RAT. (Fr.) Charnot, Y. (Lab. Gen. Comp. Physiol., Lyon, France) and G. Peres. *C. R. Soc. Biol. (Paris)* 164(8-9): 1732-1734, 1970.

3658 NON-ELECTROLYTE PERMEABILITY ACROSS Bufo bufo GALLBLADDER. (E.) Lippe, C. (U. Bari Inst. Gen. Physiol., Italy) and S. Curci. *Comp. Biochem. Physiol.* 38(2A):473-475, 1971.

3659 INTRACELLULAR CONCENTRATIONS AND IONIC RELATIVE PERMEABILITIES OF CELL MEMBRANES OF ISOLATED AND PERFUSED RAT LIVER. (Fr.) Claret, M. (Fac. Sci. Lab. Comp. Physiol., Orsay Essonne, France) and M. P. Favier. *C.R. Acad. Sci. [D] (Paris)* 272(8):1123-1125, 1971.

3660 VARIATIONS IN MUCOSAL WATER AND SODIUM TRANSFER ASSOCIATED WITH THE RAT OESTROUS CYCLE. (E.) Crocker, A. D. (U. Aston Dept. Pharmacol., Birmingham, England). *J. Physiol. (Lond.)* 214(2):257-264, 1971.

3661 DIGESTION AND ABSORPTION OF MEDIUM CHAIN TRIGLYCERIDE IN VIVO AND IN VITRO, IN COMPARISON WITH LONG CHAIN TRIGLYCERIDE. (Jap.) Kashima, K. (Kyoto Pref. Med. U., Japan). *Nippon Shokakibyo Gakkai Zasshi (Jap. J. Gastroenterol.)* 67(12):1082-1100, 1970.

3662 INTESTINAL ABSORPTION OF LIPIDS IN PREMATURE INFANTS DURING THE FIRST MONTHS OF LIFE. (It.) Murano, G. (U. Naples Inst. Clin. Pediatr., Italy) and R. Di Toro. *Pediatria (Napoli)* 78(5):781-807, 1970.

3663 THE PROPERTIES OF THE PREFERENTIAL UPTAKE OF L-LEUCINE BY ISOLATED INTESTINAL EPITHELIAL CELLS. (E.) Reiser, S. (Indiana U. Sch. Med., Indianapolis) and P. A. Christiansen. *Biochim. Biophys. Acta* 225(1): 123-139, 1971.

3664 DEVELOPMENT OF AMINO ACID TRANSPORT BY THE SMALL INTESTINE OF THE CHICK EMBRYO. (E.) Pratt, R. M., Jr. (Boston U. Biol. Sci. Ctr., Mass.) and C. Terner. *Biochim. Biophys. Acta* 225(1):113-122, 1971.

3665 RESORPTION OF BASIC AMINO ACIDS IN AGED RATS. (Hun.) Penzes, L. (Sote Gerontol. Res. Group, Budapest). *Kiserl. Orvostud.* 23(2): 137-146, 1971.

See also numbers: 3601, 3672, 3793, 3794, 4080, 4210, 4211

3666 MECHANICAL PROPERTIES OF THE ESOPHAGEAL WALL. (E.) Goyal, R. K. (Baylor Coll. Med., Houston, Tex.), P. Biancani, A. Phillips and H. M. Spiro. *J. Clin. Invest.* 50(7):1456-1465, 1971.

Pressure diameter curves obtained from rat esophagus revealed that the mucosal contribution to esophagus strength was negligible until the outer diameter almost doubled, suggesting that small intraluminal pressures are held by the muscle layer alone. Mucosal contribution increased for larger deformations and at failure held over 50% of the failure pressure of the esophagus. This is consistent with the observation that mucosal inflammation is an important factor in the production of esophageal rupture. Paths followed during loading and unloading exhibited hysteresis and were influenced by the rate of pressure change (more compliant for low rates of pressure change) and by the history of loading. Stiffness of both the mucosa and the whole esophagus increased exponentially with increasing pressure. However, at rapid rates of pressure increases, the esophageal muscles produced sigmoid loading curves.

3667 AN INTEGRATED ANATOMIC, PHYSIOLOGIC AND CINERADIOLOGIC STUDY OF THE CANINE GASTROESOPHAGEAL SPHINCTER. (E.) Rinaldo, J. A., Jr. (Providence Hosp., Southfield, Mich.), J. F. Levey, H. M. Smathers, L. W. Gardner and K. D. McGinnis. *Am. J. Dis. Child.* 16(6):556-565, 1971.

The anatomic, physiologic and cineradiologic characteristics of the gastroesophageal sphincter was studied in 10 female dogs. A narrow band (1.4 ± 0.6 mm wide) of transitional mucosa consisting of simple glands lined by columnar epithelium without parietal cells was identified. At the oral end of this band the change from squamous to columnar epithelium was abrupt; however, at the caudad end, the deepening of the glands and the occurrence of parietal cells were gradual. An inner circular and an outer longitudinal layer of striated muscle lined the esophagus. The circular layer terminated 1.4 ± 0.3 mm from the squamocolumnar junction. A thicker band of smooth muscle (10.7 ± 0.4 mm wide) was found distal to the esophageal circular muscle. The middle of the phrenoesophageal membrane was 6.3 ± 0.9 mm distal to the squamocolumnar junction. When transducers were placed over the area of muscle thickening, there was a decrease in strain with a swallow, in the direction of both the longitudinal and circular muscle layers. When the transducers were placed proximal to this area, contraction (increase in strain) occurred with swallowing. Radiographic studies indicated a biconcave area at the junction of the tubular esophagus and stomach that opened as a bolus passed into it and closed after the passage of the bolus. The area of muscle thickening seemingly represents the canine inferior esophageal sphincter.

3668 GASTRIC AND SMALL BOWEL EMPTYING AND NEUTRAL RED EXCRETION BY THE LIVER FOLLOWING EXTRAGASTRIC VAGOTOMY IN THE DOG. (E.) Amdrup, B. M. (U. Washington Sch. Med., Seattle) and C. A. Griffith. *Chir. Gastroenterol.* 5(1):49-56, 1971.

No changes in gastric emptying and small bowel function were observed in dogs following transection of the anterior gastric nerve, however, passage of barium in dogs with hepatic vagotomy, or those with hepatic plus celiac vagotomy was slow. In dogs with hepatic and celiac vagotomy, hepatic excretion of Neutral Red was decreased to 40% of the normal excretory time. Both bilirubin excretion and bile flow increased in those dogs where the dye was quickly eliminated, perhaps as a consequence of Neutral Red's choleretic action. Selective gastric vagotomy is suggested in the treatment of ulcers.

3669 THE RESPONSES OF GASTRIC MOTILITY AND THEIR LOCATION BY STIMULATING THE THORACIC CORD OF THE DOG. (E.) Semba, T. (Hiroshima U. Sch. Med., Japan), K. Fujii and Y. Fujii. *Hiroshima J. Med. Sci.* 19(2-3):73-85, 1970.

Stimulation of the thoracic cord produced excitation as well as inhibition of gastric motility in dogs. To obtain an inhibitory response, the electrode was inserted into a deeper position than that necessary to obtain an excitatory response. The inhibitory (sympathetic) responses were mainly obtained from the intermedio-medial nuclei. The ventral region of the intermediolateral nuclei was chiefly responsible for inhibition. The excitatory (parasympathetic) areas were found mainly in the dorsal nuclei, the dorsal region of the intermedio-lateral nuclei and dorsal column, and the dorsal funicle. Preganglionic excitatory neurons may arise from the dorsal nuclei and intermedio-lateral nuclei and pass through the dorsal roots to the splanchnic nerve. It was concluded that areas of inhibition and excitation are located at specific sites in the thoracic cord.

3670 GASTRIC MOTILITY INHIBITION AND EXCITATION ELICITED BY VAGAL STIMULATION. (E.) Burns, T. D. (Michigan State U. Dept. Physiol. Pharmacol., East Lansing, Mich.) and D. A. Reinke. *Am. J. Physiol.* 221(1):226-229, 1971.

Gastric body and antral contractile activities recorded by extraluminal force transducers were correlated with intraluminal pressure responses elicited by decentralized vagus stimulation in fasted rabbits. Results showed a correlation between intraluminal pressure increases and simultaneous gastric antral contractions and gastric body distension. Intraluminal increases resulting from vagal stimulation were abolished by atropine, which converted the response from excitation to inhibition while poststimulation inhibition of after contractions was not obtained in atropine-treated animals. Barium chloride was found to increase prestimulation tone, indicated by an increase in intraluminal pressure as well as contractile force of both the antrum and body. In all animals, vagal stimulation following barium administration resulted in a decreased intraluminal pressure.

3671 THE VALUE OF PHENOL RED AND CHROMIC CHLORIDE AS NONABSORBABLE GASTRIC INDICATORS. (E.) Clarke, R. J. (Gen. Hosp., Birmingham, England) and J. A. Williams. *Gut* 12(5):389-392, 1971.

The comparative losses of $^{51}CrCl_3$ and phenol red (gastric indicators) into the mucus fraction of human gastric secretion was quantitatively assessed. All but 2 of the ^{51}Cr/phenol red ratios were less than 1 for the supernatant fluid samples, indicating some loss of $^{51}CrCl_3$ relative to phenol red. All the ^{51}Cr/phenol red ratios for the mucus samples were greater than 1 suggesting that $^{51}CrCl_3$ was adsorbed into the gastric mucus. Apparently $^{51}CrCl_3$ is not an entirely suitable indicator for studies of gastric emptying.

3672 LENGTH MEASUREMENT OF GUT SEGMENTS FOR MUCOSAL TRANSPORT STUDIES. (E.) Webling, D. D. (U. Western Ontario, London, Canada). *Experientia* 27(5):516-517, 1971.

Lengths of rat intestine measured in vivo and in vitro were compared to lengths of the same gut segments completely relaxed by inhibitors. As far as the relaxed lengths may be considered as an absolute measure of gut lengths, then the lengths measured at 25°C (in vitro) were fairly constantly about 80% of this length. The in vivo lengths, though varying more between gut regions (duodenum, jejunum, ileum, colon), were about 94% of the relaxed lengths. Length measurement under each of these conditions apparently is constant enough for standardization in most transport studies. Since the length variation of gut segments in vitro at 37°C was much greater, it is suggested that such measurements would be less useful.

3673 ROLE OF UPPER INTESTINES IN THE REGULATION OF FOOD INTAKE IN PARABIOTIC RATS WITH THEIR INTESTINES "CROSSED" SURGICALLY. (E.) Lepkovsky, S. (U. California Dept. Poultry Husbandry, Berkeley), P. Bortfeld, M. K. Dimick, S. E. Feldman, F. Furuta, I. M. Sharon and R. Park. *Isr. J. Med. Sci.* 7(5):639-646, 1971.

After different periods of time, different patterns of eating developed in parabiotic rats with their intestines crossed surgically such that food eaten by each rat passed into the duodenum of the partner. The most common pattern was where 1 rat ate and the other did not, even though the latter was interested in the food. When the crossover rats were allowed to eat ad libitum, the eating rat frequently ingested excessive amounts of food and caused the noneating rat to pass undigested food (diarrhea) in the stool. X-ray studies demonstrated that eating patterns were linked to gastric emptying; the parabiotic rat whose stomach emptied first was designated the eating rat, its hunger was not satiated even though food entered it's stomach, because no food entered its duodenum and the parabiotic rat therefore continued eating. Intestinal obstructions and attendant distension, with or without hemorrhage, frequently caused death. Oropharyngeal and gastric factors played little or no role in eliciting hunger or satiety in these rats.

3674 SOME MECHANICAL PROPERTIES OF CAT INTESTINAL MUSCLE. (E.) Meiss, R. A. (U. Illinois Dept. Physiol. Biophys., Urbana). *Am. J. Physiol.* 220(6):2000-2007, 1971.

Analysis of the force-velocity relationship, the tension-length characteristics, and the decay of the quick release active state of small strips of cat circular intestinal smooth muscle were qualitatively similar to those of most other muscles. In intestinal smooth muscle, as in most smooth muscles, for the length at which maximum active tension is developed, appreciable passive tension is already present. The contraction of cat intestinal circular smooth muscle was slow (4 sec) compared to many striated muscles (human gastrocnemius 0.110 sec) but was faster than some other smooth muscles. Variations in muscle stiffness throughout the contraction cycle, as measured by mechanical stretches of varying rates and times, revealed a contraction-related stiffness following the relaxation of contractile tension. This persistent stiffness was discharged by repeated stretching in proportion to the duration and magnitude of the applied stretch.

3675 SPASMOLYTIC ACTION OF ADENOSINE ON THE GUINEA-PIG ILEUM. (E.) Sehorn, S. L. (Bowman Gray Sch. Med., Winston Salem, N. C.) and J. L. Borowitz. *J. Pharm. Pharmacol.* 23(6):429-433, 1970.

The response of the guinea pig ileum to ED40 (40% of the maximal contractile response) of acetylcholine was decreased by an average of 38% following the administration of adenosine (10^{-5} M). The response to the ED40 of histamine was reduced

90% by this same dosage of adenosine. A nearly complete blockage of the response to the ED40 of both serotonin and barium was seen in the presence of 10^{-6} and 10^{-5} M adenosine, resp. After exposure for 20 min to a lower concentration of adenosine (10^{-7} M), muscles showed an exaggerated response to barium rather than an antagonism. Also, on removal of adenosine the responses to barium were higher on the average than control responses before adenosine. Adenosine inhibited the contractile responses to a Ca-free medium when added before removal of Ca and abolished the contraction when added after the response to a Ca-free medium had been initiated. It is thought that since adenosine occurs physiologically, variation in its endogenous levels may give rise to variation in the action of certain drugs on the gastrointestinal tract.

3676 SIMULATION OF SLOW-WAVE ELECTRICAL ACTIVITY OF SMALL INTESTINE. (E.) Sarna, S. K. (U. Alberta Dept. Pharmacol., Edmonton, Canada), E. E. Daniel and Y. J. Kingma. *Am. J. Physiol.* 221(1):166-175, 1971.

Intestinal electrical activity was studied using analog computer models of the small intestine, which was simulated by a chain of loosely coupled relaxation couplers. Only 1 stable frequency plateau was found in the small intestine of dogs, extending over the entire duodenum and part of the jejunum. The wave forms recorded from successive electrodes in the plateau region were phase locked as they never fell 360° or more out of phase. Aboral to this plateau, the wave forms showed a tendency to get phase locked, but then different waves fell 360° or more out of phase quite irregularly, thus preventing stable plateau formation. Both forward and backward couplings were necessary to simulate the characteristic properties of the intestine. Two proposed models of intestinal electrical activity differed from each other in the values of oscillator parameters and the manner in which each oscillator was coupled to the adjacent one. Effects on the frequency and phase relationships of the intestinal electrical activity following transection, constriction or cutting of longitudinal and circular muscle layers simulated by the models were constant with observed experimental data.

3677 A COMMENT ON "PERISTALSIS": A COMMON ERROR IN SEMANTICS. A STUDY OF INTRALUMINAL PRESSURE IN THE HUMAN SMALL BOWEL. (E.) Gaglio, M. (U. Catania Dept. Med., Italy), F. Mangiafico, F. Marletta and I. Ottaviano. *Chir. Gastroenterol.* 5(1):45-48, 1971.

Enterotensiograms recorded from jejunal loops by 2 or 3 open-tip catheters showed spontaneously changing activities consisting of local tensional activity without any evident mechanical effect. The longer the sequence and the higher the single wave synchronically recorded from 2 points, the higher the possibility of seeing local movements on the fluoroscope (supposedly mixing or so-called segmentation movements). The term peristalsis, even though it ostensibly denotes a propulsive movement rolling in the intestinal wall, should actually be considered a generic expression, in fact, all treatment of the intestinal content is produced by a wall activity (not only peristalsis but also tone and mixing).

3678 ATROPINE-RESISTANT SPASM OF THE DOG COLON INDUCED BY INTERMITTENT PELVIC NERVE STIMULATION. (E.) Goldenberg, M. M. (Norwich Pharmacal Co., N. Y.) and R. H. Burns. *Life Sci.* [*I*] 10(10):591-600, 1971.

Investigations were made to determine whether intermittent electrical stimulation of the pelvic nerve of the dog in vivo leads to sustained spasm of the colon and to determine the effect of selective antagonists on colon response. Hexamethonium (1 mg/kg, i.v.) and procaine (5 and 10 mg/kg i.v.) both abolished contractility of the colon in response to intermittent pelvic nerve stimulation. The former ganglionic blocking agent also caused a marked fall in blood pressure, while the latter also reduced the contractile response of the colon to acetylcholine. In 9 of 12 dogs, atropine caused temporary inhibition (1-5 min) of the colonic contractile response; thereafter, atropine-resistant contractions appeared and persisted throughout the remainder of the stimulation period. The pattern of these contractions was characterized by intermittent spasms of slow onset and long duration. Antihistaminics (chlorpheniramine and promethazine) or methysergide did not significantly inhibit contractions in response to intermittent pelvic nerve stimulation. The presence of atropine-resistant contractile responses indicates that a transmitter substance other than acetylcholine, histamine or serotonin is responsible for such activity in the dog colon.

3679 LONGITUDINAL AXIAL COUPLING OF SLOW WAVES IN PROXIMAL CAT COLON. (E.) Christensen, J. (US VA Hosp., Iowa City, Iowa) and R. L. Hauser. *Am. J. Physiol.* 221(1): 246-250, 1971.

Six volume recording electrodes put on cat colon circular muscle, exposed by removal of the mucosa, recorded slow waves simultaneously from 6 sites 5.8 mm apart. During phase lock across all 6 points, the first of which was just below the ileocecal junction, slow waves spread orad 8.7%, caudad 3.5% and split (orad proximally and caudad distally) 87.9% of the time. Apparent velocity caudad (3.6 mm/sec) was greater then velocity orad (2.6 mm/sec). Phase lock occurred over distances varying from 5.8 to 28.8 mm; the frequency was 3.12 cycles/min. Direction of phase lag and distance of phase lock vary and may affect fecal flow through effects on integration and polarization of wall movements. Rectification in coupling of slow wave oscillators was suggested by different apparent velocities in the 2 directions.

3680 MOVEMENT OF SEGMENTAL CONSTRICTIONS IN THE HUMAN COLON. (E.) Ritchie, J. A. (Radcliffe Infirm., Oxford, England). *Gut* 12(5): 350-355, 1971.

Time-lapse cinefluorography was used to visualize changes in the segmental pattern of opaque contents in the transverse colon among patients with diverticulosis. Muscular constrictions separating the opaque masses of bowel contents relaxed, and later reformed in a different spatial relationship to fixed points on the bowel wall represented by the necks of diverticula in some patients. With other cases, ring contractions moved progressively along the bowel wall, temporarily occluding the necks of any diverticula they passed. In front of the advancing constrictions, bowel contents were transported at varying rates and in either direction. The progression of segmental constriction along the bowel probably represents the basic mechanism of the peristaltic ripples.

3681 EFFECT OF A T TUBE ON PROXIMAL CHOLEDOCHAL PRESSURE. (E.) Michaelian, M. J. (U. Southern California Sch. Med., Los Angeles), C. L. Berne and A. J. Donovan. *Am. J. Surg.* 122(1):16-17, 1971.

Proximal choledochal pressure in the common bile duct was investigated following insertion of a T tube. Results showed an elevation of proximal choledochal pressure in 6 of 8 dogs when the T-tube was occluded; however, gravity drainage from the T-tube resulted in a decreased choledochal pressure in 7 of 8 dogs, this decline being consistent with physical laws relative to the effect of a siphon. The demonstration of a reduction in proximal choledochal pressure with gravity drainage of bile suggests a cause and effect relationship regarding a reduction in volume of drainage from an established biliary fistula after a T-tube is inserted more distally in the common bile duct. The rationale for employment of a T-tube for choledochostomy in treatment of major hepatic trauma is apparently valid.

3682 A DEVICE FOR PLOTTING VOLUME PRESSURE CURVES OF ESOPHAGEAL BALLOONS IN SITU IN A CLINICAL SET-UP. (E.) Douma, J. H. (TNO Inst. Med. Physiol., Utrecht, Netherlands) and C. D. Laros. *Bull. Physiopathol. Resp.* 7(1): 215-226, 1971.

3683 GASTRODUODENAL EMPTYING IN THE PIG. CHRONIC FISTULATION THROUGH THE EXTRAPLEURAL THORACIC PATHWAY AND A TECHNIQUE FOR THE MATHEMATICAL ANALYSIS OF GASTRIC EMPTYING. (Fr.) LaPlace, J. P. (Natl. Res. Ctr. Zootech., Jouy-en-Josas, France) and R. Tomassone. *Ann. Zootech.* 19(3):303-332, 1970.

3684 ELECTRICAL ACTIVITY OF THE LONGITUDINAL MUSCLE LAYER OF THE DUODENUM OF THE RABBIT. (Fr.) Gonella, J. (CNRS Inst. Neurophysiol., Marseille, France). *J. Physiol. (Paris)* 62(6):447-476, 1970.

3685 THE EFFECTS OF N-METHYLHYOSCINEMETHYL SULFATE UPON GASTROINTESTINAL MOTILITY AND SALIVATION. (Jap.) Hukuhara, T. (Okoyama U. Med. Sch., Japan), S. Nakayama and H. Fukuda. *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4):263-269, 1970.

3686 EFFECTS OF POTASSIUM TABLETS OF DIFFERENT DISSOLUTION RATES ON MOTILITY PATTERN OF SMALL INTESTINE IN THE DOG. (E.) Sundell, G. (Hassle Co. Pharmacol. Lab., Goteborg, Sweden). *Acta Pharm. Suec.* 8(2):73-82, 1971.

3687 SULFHYDRYL GROUP REAGENTS: EFFECT ON INTESTINAL SMOOTH MUSCLE. (E.) Stubbins, J. F. (Med. Coll. Virginia., Richmond) and P. M. Hudgins. *Experientia* 27(6):669-670, 1971.

3688 HOW DOES INSULIN STIMULATE THE LOWER ESOPHAGEAL SPHINCTER? (E.) Grossman, M. I. (VA Ctr., Los Angeles, Calif.). *Gastroenterology* 61(1):119-120, 1971.

3689 COLON MOTILITY AND ITS ALTERATIONS IN MAN. (Fr.) Holdstock, D. J. (Manchester Roy. Infirm., England). *Ann. Gastroenterol. Hepatol. (Paris)* 7(3):217-238, 1971.

3690 SIMULTANEOUS CINERADIOGRAPHIC AND MANOMETRIC ANALYSIS OF INCOMPLETE EMPTYING OF THE ESOPHAGUS. (E.) Longhi, E. H. (VA Hosp., Houston, Tex.) and P. H. Jordan, Jr. *Am. J. Surg.* 121(3):229-237, 1971.

3691 USE OF METOCLOPRAMIDE FOR THE PHARMACORADIOGRAPHIC STUDY OF THE DOG GASTROINTESTINAL TRACT. (It.) Vitali, G. F. (U. Parma Inst. Clin. Vet. Med., Italy). *Clin. Vet. (Milano)* 94(1):1-14, 1971.

3692 THE INTERDEPENDENCE OF THE MOTOR ACTIVITIES OF THE STOMACH, THE DUODENUM AND THE BILE PASSAGES. (Fr.) Klimov, M. P. K., A. A. Fokina and G. M. Antonova. *J. Med. Chir. Prat.* 142(2):51-55, 1971.

593 MONITORING OF INTESTINAL SOUNDS BY PHONOGRAPHY. (Hun.) Marton, Z., J. uri and G. Bohenszky. *Orv. Tech.* 9(1):24-25, 971.

3694 BIOPHYSICAL PROPERTIES OF THE LONGITUDINAL SMOOTH MUSCLE OF THE GUINEA PIG RECTUM. (E.) Kuriyama, H. (Kyushu U. Sch. Dent., Fukuoka, Japan) and F. Mekata. *J. Physiol. (Lond.)* 212(3):667-683, 1971.

See also numbers: 3702, 3818, 4020, 4107

3695 CONCOMITANT SYNTHESIS OF MEMBRANE PROTEIN AND EXPORTABLE PROTEIN OF THE SECRETORY GRANULE IN RAT PAROTID GLAND. (E.) Amsterdam, A. (Hebrew U. Jersualem, Israel), M. Schramm, I. Ohad, Y. Salomon and Z. Selinger. *J. Cell Biol.* 50(1):187-200, 1971.

Ultrastructural examination of the rat parotid gland revealed that after the fusion of secretory granule membrane with the cell membrane during secretion, the granule membrane appeared to be converted into small vesicles which seemed to return to the pool of membranes in the Golgi region. Since the new secretory granules always originate in the periphery of the Golgi complex, it could be supposed that the membrane of the new granule is contributed by the pool of preexisting membranes. Radioactive amino acid labeling of membrane-specific protein of the secretory granule was as high at all times as that of the granule's exportable content. Apparently, at least the protein part of the membrane was synthesized de novo. Gel electrophoresis differentiated proteins of the granule membrane from those of the granule content. The amino acid composition of the secretory granule membrane (high proline content) was vastly different from that of the granule's content and from that of the mitochondrial membrane. It seems possible that the exportable protein leaves the endoplasmic reticulum already enveloped by the newly synthesized membrane.

3696 RELATIONSHIP OF CHEMICALLY INITIATED ENZYME SECRETION TO METABOLISM IN RAT PAROTID IN VITRO. (E.) Lindsay, R. H. (U. Alabama Dept. Pharmacol., Birmingham), T. Ueha, B. S. Hulsey and R. W. Hanson. *Am. J. Physiol.* 221(1):80-85, 1971.

3697 THE PERIODICITY IN THE ACTIVITY OF THE SALIVARY GLANDS, STOMACH, AND DUODENUM IN HUNGER AND AFTER INGESTION OF A SMALL AMOUNT OF FOOD. (Rus.) Sukhodolo, V. D. (Med. Inst., Tomsk, USSR), A. O. Didorenko, R. K. Gainutdinova and L. G. Popova. *Fiziol. Zh. SSSR* 56(12): 1820-1827, 1970.

STOMACH

3698 INHIBITORY EFFECT OF GLUCAGON ON GASTRIC ACID SECRETION INDUCED BY GASTRIN AND ITS DERIVATIVES IN DOGS AND RATS. (E.) Lin, T. M. (Lilly Res. Labs., Indianapolis, Ind.) and G. F. Spray. *Arch. Int. Pharmacodyn. Ther.* 191(1):88-95, 1971.

Gastrin-induced total acid output and gastric volume in Heidenhain dogs were reduced significantly for about 4 or 5 hr by a single dose of glucagon (50 µg/kg s.c.). Repeated s.c. glucagon abolished free HCl in the Heidenhain dog and markedly reduced the gastrin-induced acid output in dogs with Thomas type (vagally innervated) pouch. Both secretin (100 IU i.v.) and glucagon (same dosage as above) significantly inhibited the secretory rate and the total acid output in Heidenhain dogs during steady state acid secretion (induced by repeated gastrin). The major inhibitory effect of glucagon was on secretory rate with minor reductions on acid concentration. This inhibition of acid secretion was not directly related to the hyperglycemic action of glucagon. In chronic fistula rats the acid secretion induced by gastrin was also significantly inhibited by glucagon. Glucagon inhibited the response to gastrin far greater than that to histamine.

3699 EFFECT OF ANTRECTOMY ON ACID SECRETION FROM PAVLOV POUCHES IN CAT. (E.) Dinbar, A. (Tel Hashomer Hosp., Tel Aviv, Israel), H. H. Trout, III and M. I. Grossman. *Proc. Soc. Exp. Biol. Med.* 137(2):392-394, 1971.

Antrectomy in cats caused an increase in acid secretion from Pavlov pouches in response to histamine and pentagastrin admin. and significantly decreased the response to various doses of insulin. Addition of the low dose background of pentagastrin prior to antrectomy had no significant effect on the response to 0.6 IU/kg insulin; however, addition of the same small dose of pentagastrin after antrectomy caused marked augmentation, giving a response significantly greater than to either dose of insulin alone before or after antrectomy. This indicates that the increased response of the oxyntic glands, after antrectomy, occurs with combined vagal and gastrin stimulation as well as with gastrin alone.

3700 SEPARATION OF THE INTRINSIC FACTOR ANTIBODIES FROM PARIETAL CELL ANTIBODIES IN PERNICIOUS ANEMIA SERUM BY GEL FILTRATION.

(E.) Jacob, E. (New York Med. Coll., N. Y.) and G. B. J. Glass. *Proc. Soc. Exp. Biol. Med.* 137(1):243-247, 1971.

The circulating intrinsic factor antibodies were separated from the parietal cell antibodies in pernicious anemia serum by gel filtration on Sephadex G-200 column after they had been coupled to the intrinsic factor of gastric juice. The intrinsic factor-intrinsic factor antibody containing fraction did not contain parietal cell antibodies and did not produce immunofluorescence of the parietal cell on indirect Coons' test. After treatment of this fraction with diluted HCl, which causes dissociation of the above fraction, the separation of the intrinsic factor antibody from the intrinsic factor was achieved by gel filtration on Sephadex G-150 column. By this technique intrinsic factor antibody could be obtained from pernicious anemia serum free from parietal cell antibody. This method was simpler than the method of obtaining intrinsic factor antibody in the rabbit by prolonged immunization of the animals with intrinsic factor or intrinsic factor-B_{12} complex.

3701 NOVEL PHARMACOLOGICAL ACTIVITY OF A SERIES OF SUBSTITUTED PYRIDINES. (E.) Butler, D. E. (Parke, Davis & Co., Ann Arbor, Mich.), P. Bass, I. C. Nordin, F. P. Hauck, Jr. and Y. J. L'Italien. *J. Med. Chem.* 14(7):575-579, 1971.

The effect of 113 phenoxypyridines and arylpyridines on gastric secretion was tested on pylorus-ligated Carworth Farm rats. The dose of the free base which reduced gastric secretion by 50% (ED_{50}) when injected s.c. is reported for each compound. The compounds with the lowest ED_{50} values were 4-phenoxypyridine (5 mg/kg), 3-phenoxypyridine (4.5 mg/kg), 2-phenylpyridine N-oxide (2.3 mg/kg), 2-(2-thienyl)pyridine (4.2 mg/kg), 3-phenylpyridine (2.0 mg/kg), and 2,2'-bipyridine (2.4 mg/kg). It was demonstrated that none of the compounds with ED_{50} values of 10 mg/kg or less had anticholinergic activity in rats or had ganglionic blocking or adrenergic blocking activity in dogs.

3702 PEPSIN SECRETION, GASTRIC MOTILITY AND MUCOSAL BLOOD FLOW IN THE ANAESTHETIZED CAT. (E.) Reed, J. D. (Univ. Med. Sch., Newcastle upon Tyne, England) and D. J. Sanders. *J. Physiol. (Lond.)* 216(1):159-170, 1971.

During vagal stimulation in anesthetized cats there was a weak relationship between pepsin output and gastric mucosal blood flow. Since H^+ output correlated strongly with mucosal blood flow, it seems apparent that pepsin secretion is not very dependent on mucosal blood flow. During vagal stimulation, when H^+ secretion was accompanied by pepsin secretion, gastric mucosal blood flow/unit H^+ output was significantly greater than during pentapeptide secretion when pepsin was not secreted. Splanchnic nerve stimulation had no effect on pepsin output, but decreased mucosal blood flow and acid output when blood pressure was kept constant. Motility spikes produced by vagal stimulation or a series of injections of acetycholine (i.a. close to the stomach) were markedly inhibited during splanchnic stimulation whether or not the blood pressure was elevated.

3703 HISTAMINE AND/OR CORTISOL STIMULATED GASTRIC SECRETION IN NORMAL AND ADRENALECTOMIZED RATS. (E.) Kowalewski, K. (U. Alberta Surg. Med. Res. Inst., Edmonton, Canada). *Arch. Int. Pharmacodyn. Ther.* 189(2):328-335, 1971.

Concentration of HCl in gastric secretion was significantly decreased in both nonstimulated spontaneous secretion and stimulated (cortisone and/or histamine) secretion following adrenalectomy in gastric fistula rats. Gastric juice volume was reduced after adrenalectomy only in histamine and histamine + cortisol treated rats. Pepsin concentration was reduced in spontaneous and cortisol stimulated gastric secretion in adrenalectomized rats, as compared to controls although pepsin output was decreased in most adrenalectomized rats. It was concluded that vagus dependent, histamine stimulated and cortisol stimulated gastric secretion may be altered by bilateral adrenalectomy in rats.

3704 THE ACTIVITY OF N-ACETYLGLUCOSAMINE KINASE FROM HUMAN GASTRIC MUCOSA. (E.) Gindzieński, A. (Med. Acad. Dept. Gen. Chem., Bialystok, Poland), K. Zwierz and A. Różański. *Biochem. Med.* 5(3):188-194, 1971.

The activity of N-acetylglucosamine kinase in the human gastric mucosa was found to be highest in the postmitochondrial fraction. The kinase showed optimum activity at pH 7.9, above which the enzyme's activity diminished slightly. A quantitative analysis of the reaction product showed that on hydrolysis with H_2SO_4, 1 µmole of N-acetylglucosamine phosphate liberated 1.02 µmole of phosphate. Although no correlation was found between the activity of N-acetylglucosamine kinase and pathological diagnosis of ulcers, the primary nature of aminosugar metabolism disorders in ulcer disease cannot be excluded as a possibility.

3705 SOLUBILIZATION AND CHEMICAL AND IMMUNOCHEMICAL CHARACTERIZATION OF SPARINGLY SOLUBLE CANINE GASTRIC MUCIN. (E.) Kim, Y. S. (VA Hosp., San Francisco, Calif.) and M. I. Horowitz. *Biochim. Biophys. Acta* 236(3):686-701, 1971.

Na_2SO_3 and dithioerythritol effectively solubilized sparingly soluble canine gastric mucins. This finding suggests cleavage of disulfide bonds during solubilization. A minimum of 1 μmole of cystine was cleaved per 56 mg of protein in the glycoprotein. Since the solubilized glycoproteins were contained in the excluded fraction from the Sephadex G-200 column, the molecular weights of these glycoproteins are high, perhaps exceeding 200,000. Analysis by immunodiffusion following fractionation indicated that the 2 main glycoproteins which were eluted at 0.2 and 0.3 M NaCl contained antigenic factors in common. The carbohydrate and amino acid compositions were similar among the glycoproteins fractionated on DEAE, and the difference in electrophoretic mobility probably resulted in part from differences in sulfate or in S-sulfonate content. The principal carbohydrate-to-protein linkage was seemingly through an O-glycosidic linkage between the hexosamine at the nonreducing end of oligosaccharide side-chains and serine and threonine of the peptide core.

3706 CONTROL OF GASTRIC SECRETION: NO ROOM FOR HISTAMINE? (E.) Johnson, L. R. (U. Oklahoma Med. Ctr., Oklahoma City). *Gastroenterology* 61(1):106-118, 1971.

Although gastric acid secretion may be dissociated from histamine release and formation, and pharmacological studies of agonist receptor interactions indicate that gastrin does not stimulate the parietal cell through histamine, the possibility of the involvement of endogenous histamine in gastric physiology still exists. Histamine may, for example, play a role in the regulation of metabolism of the gastric mucosa. This type function would be more in keeping with its wide distribution. A number of biochemical incursions into this field are necessary to determine the subcellular localization of histamine and to analyze the mechanism which regulates histidine decarboxylase activity. Characteristics of histamine binding within the mucosa and histamine levels and metabolism in relation to the general metabolism of the tissue must also be dealt with.

3707 EFFECT OF LABYRINTHECTOMY ON GASTRIC SECRETION. (E.) Schapiro, H., C. W. Gross (U. Tennessee Coll. Med., Memphis), T. Nakamura, L. D. Wruble and L. G. Britt. *Arch. Otolaryngol.* 94(1):36-39, 1971.

Auditory and vestibular deprivation caused by bilateral labyrinthectomy in dogs resulted in a decrease in both gastric volume and acid concentration following administration of 0.1 mg histamine. The gastric volume was again reduced following a larger dose (1 mg) of histamine, while the acid concentration was unaltered. Insulin (1.0 IU/kg) depressed both the gastric volume and the acid concentration over a 4-month period. Auditory and vestibular deprivation apparently acts by reducing gastric vagal activity and therefore reduces the sensitivity of both parietal and chief cells.

3708 THE EFFECT OF THE HISTIDINE DECARBOXYLASE INHIBITOR BROCRESINE (NSD-1055) ON GASTRIC ACID SECRETION IN RATS. (E.) Becker, M. (U. Tubingen Dept. Pharmacol., Germany) and K.-F. Sewing. *J. Pharm. Pharmacol.* 23(6):434-437, 1971.

Tetragastrin-stimulated acid secretion was reduced by 22.4% in rats following i.v. injection of brocresine, a histidine decarboxylase inhibitor, however, histamine stimulated secretion was significantly enhanced by either i.p. (137.5%) or i.v. (60.3%) injection of brocresine. The stimulating effect of an oral administration of brocresine on tetragastrin and histamine stimulated secretion was statistically nonsignificant. None of the routes of administration of brocresine had any effect on the bethanechol-stimulated gastric acid secretion. The failure of this agent to inhibit gastric acid secretion in rats leaves doubt about the contribution of histamine synthesis to the stimulation of gastric acid secretion. Actually, the observed enhancement of histamine-stimulated secretion indicated brocresine-induced diamine oxidase inhibition.

3709 HUMAN ANTIBODY AGAINST RAT GASTRIC PARIETAL CELLS AND KIDNEY BRUSH BORDER. (E.) Ireton, H. J. C., H. K. Muller and A. R. McGiven (Monash U. Med. Sch., Prahran, Victoria, Australia). *Clin. Exp. Immunol.* 8(5):783-789, 1971.

The demonstration of immunofluorescent staining of gastric parietal cells and the brush border of renal tubules in rats by a component present in the IgG fraction of some human sera suggests that this is due to an antibody. Activity against both organs was removed by absorptions with either rat gastric mucosal homogenate or rat kidney preparations indicating a common or cross-reacting antigen in these tissues. Significant activity against brush border was invariably associated with parietal cell staining, but the reverse was not true. Over 3/4 of the sera containing parietal cell antibodies from patients with pernicious anemia did not stain renal brush border. Human gastric mucosal homogenate absorbed out activity against human parietal cells but had no effect on sera which reacted solely with rat kidney and stomach. Rat brush border-parietal cell antisera apparently contained antibody against an antigen which was not present in human parietal cells. The significance of finding antibody in 14% of human subjects is that it should not be mistaken for the conventional parietal cell antibody by laboratories which employ sections of rat stomach for diagnostic procedures.

3710 EFFECTS OF NICOTINE ON GASTROINTESTINAL SECRETIONS. (E.) Konturek, S. J., T. E. Solomon, W. G. McCreight, L. R. Johnson and E. D. Jacobson (U. Oklahoma Med. Ctr., Oklahoma City). *Gastroenterology* 60(6):1098-1105, 1971.

The effect of nicotine on gastric, pancreatic and hepatic secretions were studied in 12 dogs prepared with various combinations of Heidenhain pouches, gastric, pancreatic and biliary fistulas to determine if cigarette smoking thus contributes to the formation of duodenum ulcer. Nicotine (100 μg/kg body weight i.v.) had no effect on gastric acid secretion, net movement of fluid and electrolytes or gastric mucosal blood flow. Nicotine (11 μg/kg i.v.) caused a 50% decrease in both the volume and bicarbonate output of hepatic bile. A significant inhibition of both pancreatic flow rate and bicarbonate output was elicited by nicotine (12.5-100 μg/kg i.v.). The inhibition of hepatic and pancreatic bicarbonate secretion by nicotine from cigarette smoke may play a role in duodenal ulcer formation by depriving the duodenum of the alkali needed to neutralize gastric acid.

3711 STUDIES ON THE MECHANISM OF ACTIVATION OF PEPSINOGEN. PART I. CONFORMATIONAL CHANGE OF PEPSINOGEN IN THE PROCESS OF ACTIVATION IN ACID SOLUTION. (E.) Funatsu, M. (Kyushu U. Fac. Agric., Fukuoka, Japan), Y. Harada, K. Hayashi and B. Jirgensons. *Agric. Biol. Chem.* 35(4):566-572, 1971.

Investigation on the mechanism of activation of pepsinogen (prepared from swine fundic mucosa) revealed that at a pH of 2.0, no peptide bond cleavage occurred in denatured pepsinogen. This suggested that a specific conformation of pepsinogen, formed in acid solution was necessary for the peptide bond cleavage on the activation. In the course of activation, the circular dichroism spectrum of pepsinogen gradually became similar to the spectrum of pepsin. Curves expressed a gradual formation of pepsin at pH 4.46. Apparently the glutamyl-41-isoleucine bond cleavage occurred in those solutions, with the lability of the above bond seemingly depending on a specific constrained conformation of the polypeptide chain at a definite pH.

3712 COMPARISON OF HISTAMINE AND PENTAGASTRIN IN STIMULATION OF PEPSIN SECRETION IN MAN. (E.) Berstad, A. (Ulleval Hosp., Oslo, Norway) and H. Petersen. *Scand. J. Gastroenterol.* 6(3):209-216, 1971.

Daily i.v. injection of graded doses of histamine dihydrochloride (0.4-26.2 μg/kg/hr) and of pentagastrin (0.055-7.0 μg/kg/hr) over 3 days elicited similar maximal acid responses in 3 healthy subjects. The observed and calculated maximal pepsin response was greater with histamine, owing to lower concentrations of pepsin in the pentagastrin stimulated gastric secretions. With increasing doses of the stimulants, the pepsin:acid ratio, which was lower with pentagastrin than with histamine, decreased. It was concluded that histamine is superior to pentagastrin as a stimulant of pepsin secretion in man. The marked fall in the pepsin:acid ratio from the basal level following stimulation with pentagastrin and histamine indicates that both agents are stronger stimulants of acid than of pepsin secretion.

3713 INACTIVATION OF HUMAN GASTRIC PEPSIN BY DUODENAL JUICE. (E.) Berstad, A. (Ulleval Hosp., Oslo, Norway). *Scand. J. Gastroenterol.* 6(3):241-244, 1971.

In vitro studies on the effect of pH on pepsin stability in human gastric juice were used to obtain information about the inactivation of pepsin following regurgitation of duodenal juice into the stomach. Results showed that the amount of pepsin in pentagastrin-stimulated specimens of gastric juice was greatly reduced by increasing the pH from 1.5 to 4 with NaOH. No destruction of pepsin occurred either with mixtures of duodenal juice or sodium bicarbonate with gastric juice, if pH remained below 6.0. In the pH range 6.0 to 8.0, the peptic activity of gastric juice was reduced much more rapidly in the presence of duodenal juice than in the presence of sodium bicarbonate. The inactivation of pepsin was slower if the proteolytic enzymes of the duodenal juice were destroyed by boiling. More rapid inactivation was achieved if the sodium bicarbonate solution added contained crystalline trypsin. These in vitro results indicate that regurgitation of duodenal juice into the stomach does not inactivate pepsin in gastric juice to any significant degree at pH below 6.

3714 ON THE MECHANISM OF ACID SECRETORY INHIBITION BY ACETAZOLAMIDE. (E.) Hersey, S. J. (Emory U. Dept. Physiol., Atlanta, Ga.) and W. L. High. *Biochim. Biophys. Acta* 233(3):604-609, 1971.

In the presence of acetazolamide, histamine-stimulated acid secretory rates in bullfrog gastric mucosa were decreased at every value of electrical potential difference. The addition of acetazolamide to the nutrient medium resulted in a rapid and substantial increase in spectrophotometric absorption of bromcresol purple, indicating an alkaline pH change. Acetazolamide produced a redox change in cytochrome a_3. In this case acid secretory inhibition was associated with a reduction of the cytochrome, while thiocyanate inhibition produces an oxidation. Apparently acetazolamide acts primarily on intracellular acid-base regulation as opposed to having a direct effect on the hydrogen secretory mechanism. It is thought that this action may be due to inhibition of carbonic anhydrase.

3715 THE SECRETORY FUNCTION OF THE STOMACH IN THE CANINE FETUS: THE USE OF AN EXPERIMENTAL MODEL TO TEST THE RESPONSE TO GASTRIC STIMULANTS. (E.) Coran, A. G. (Naval Med. Res. Inst., Bethesda, Md.) and R. L. Bernstine. *J. Pediatr. Surg.* 6(3):324-332, 1971.

The pH of the gastric fluid from canine fetuses 2 weeks from term was significantly higher than that from the older fetuses and newborns, the pH in no instance being markedly acid. The pH of the gastric contents of the Histalog-stimulated group (6.94) was significantly lower than that of the control (7.85) or insulin-stimulated groups (7.44). In fetuses 2 weeks from term, the flat epithelial stomach lining was composed almost entirely of undifferentiated cells. Parietal cells were absent in fetuses 2 weeks from term and were rarely seen in the term fetus and became apparent only at 7 days following birth.

3716 SYNTHESIS AND SECRETAGOGUE ACTIVITY OF A POTENT FLUORESCENT ANALOG OF THE GASTRIN PEPTIDES. (E.) Sachatello, C. R., J. Sedwick, C. L. Moriarty, O. Grahl-Nielsen and G. L. Tritsch (Roswell Park Mem. Hosp., Buffalo, N. Y.). *Endocrinology* 88(6):1300-1302, 1971.

In dogs, substitution of fluorescein for the carbobenzoxy group of the known secretagogue Gastratet (carbobenzoxytryptophylmethionylaspartylphenylalanineamide) did not appreciably alter the physical or chemical properties of the peptide moiety and, similarly, the tetrapeptide did not alter the fluorescent property of fluorescein. The acid and pepsin secretory response to this compound was comparable to that of Gastratet. The compound was also rapidly metabolized. The ability to detect fluorotetragastrin in amounts as small as 0.5 μg by ultraviolet illumination and 0.01 this amount by spectrofluorophotometry suggests that this analog may offer an opportunity to measure the distribution, binding and metabolism of a hormonally active tetrapeptide analog of human gastrin.

3717 PROTEIN BINDING OF POTENT ANALOGS OF THE GASTRIN PEPTIDES. (E.) Sachatello, C. R. and G. L. Tritsch (Roswell Park Mem. Inst., Buffalo, N. Y.). *Endocrinology* 88(6):1303-1308, 1971.

Fluorotetragastrin, a potent gastrin peptide analog was bound to both canine and human serum albumin as demonstrated by agar gel electrophoresis at pH 8.6. The binding was confirmed by the observation of a change in the absorption spectrum of bound fluorotetragastrin. Gastratet (the carbobenzoxy analog of C-terminal tetrapeptide of gastrin) had 2 binding sites with an association constant of 3300 M^{-1} on albumin. About 65% of the circulating Gastratet may be bound in human serum when this agent is used to study gastric secretion. Binding of fluorotetragastrin with homogenates of gastric mucosa known to contain parietal cells was not observed, possibly because the receptor site on the target cell is a function of the structural integrity of the target cell membrane per se.

3718 LIPASE IN HUMAN GASTRIC JUICE. (Pol.) Szafran, H. (Med. Acad. Gen. Surg. Clin., Cracow, Poland). *Przegl. Lek.* 29(4): 342-354, 1971.

3719 GASTRIC SECRETION STUDY ON DOGS CONTINUOUSLY PERFUSED WITH HISTAMINE. (E.) Cannata, B. (Natl. U. Cuyo Sch. Med., Argentina), A. Alonso, C. Zeolite, R. Born, E. Figueroa. J. R. E. Suárez. *Acta Gastroenterol. Lat. Am.* 2(4):199-202, 1970.

3720 GASTRIC SECRETION STUDIES IN HYPOXIC RATS. (E.) Alonso, A. (Natl. U. Cuyo, Argentina), B. Cannata, C. Zeolite, R. Born and J. R. E. Suárez. *Acta Gastroenterol. Lat. Am.* 2(4):195-197, 1970.

3721 HYDROCHLORIC ACID SECRETION BY GASTRIC MUCOSA. (E.) Forte, J. G. (U. California Dept. Physiol., Berkeley). *Membranes Ion Transplant.* 3:111-165, 1971.

3722 THE FUNCTIONAL STATES OF THE STOMACH IN PATIENTS WITH ECZEMA. (Rus.) Abdusametova, S. R. *Vestn. Dermatol Venerol.* 44(12):29-32, 1970.

3723 THE EFFECTS OF GLUCOCORTICOIDS ON GASTRIC SECRETION IN THE CANINE HEIDENHAIN POUCH. (Jap.) Shitara, K. (Gunma U. Sch. Med., Maebashi, Japan). *Kitakanto Med. J.* 20(2):104-111, 1970.

3724 THE PATTERNS OF FREE AMINO ACIDS AND CONCENTRATION OF AMINO NITROGEN IN THE GASTRIC CONTENT AFTER ADMINISTRATION OF PREDNISONE. (Pol.) Florkiewicz, H. (Med. Acad. 1st Intern. Dis. Clin., Lublin, Poland). *Pol. Tyg. Lek.* 26(17):624-627, 1971.

3725 THE RADIOIMMUNOASSAY OF GASTRIN. (Fr.) Accary, J.-P. (Bichat Hosp., Paris) and S. Bonfils. *Arch. Fr. Mal. App. Dig.* 60(3, Suppl. 1):79-91, 1971.

3726 GASTRIC ACID SECRETION AND MUCOSAL MORPHOLOGY IN ROSACEA. (Ger.) Drunkenmolle, R. (U. Halle Dermatol. Clin., Germany) and U. Schulz. *Dermatologica* 141(6): 385-392, 1970.

STOMACH

3727 EFFECT OF HYPOPROTEINAEMIA ON GASTRIC SECRETION. (E.) Souidan, M. Z. A. (Ain Shams U. Med. Sch., Cairo, Egypt), A. H. Mohamed, M. S. El Serougi and M. A. Mahgoub. *Ain Shams Med. J.* 22(1):39-51, 1971.

3728 THE EFFECT OF 2-DEOXYGLUCOSE ON GASTRIC SECRETION IN DOGS. (Hun.) Varro, V. (Med. U., Szeged, Hungary), M. Mignon, I. Shimazu and S. Bonfils. *Kiserl. Orvostud.* 23(2):181-187, 1971.

3729 THE EFFECT OF PREDNISONE ON THE CONCENTRATION OF TOTAL PROTEIN, MUCUS AND GLUCOSAMINE IN GASTRIC JUICE. (Pol.) Florkiewicz, H. (Med. Acad 1st Clin. Intern. Dis., Lublin, Poland). *Pol. Tyg. Lek.* 26(16): 585-588, 1971.

3730 EXPERIMENTALLY INDUCED GRANULE RELEASE IN THE ENDOCRINE CELLS OF DOG PYLORIC ANTRUM. (E.) Fujita, T. (Univ. Med. Sch., Niigata, Japan) and S. Kobayashi. *Z. Zellforsch. Mikrosk. Anat.* 116(1):52-60, 1971.

See also numbers: 3635, 3828, 3904

PANCREAS

3731 A NEW CANNULA FOR THE COLLECTION OF PANCREATIC JUICE IN THE DOG. (E.) Thambugala, R. L. (Roy. Postgrad. Med. Sch., London). *Br. J. Surg.* 58(5):393-396, 1971.

The cannula described is a single unit made almost entirely of polypropylene, which is less irritating to animal tissues than metal. The method of collecting pancreatic juice involves an internal fistula created between the duodenum and the isolated duodenal pouch; the pouch merely acts as an extension of the pancreatic duct. This new cannula allows pancreatic juice to flow freely into the duodenum between experiments, with uninterrupted collection of the juice during experiments by closing off the connecting channel to the duodenum. There is no loss of pancreatic juice as a result of seepage around a cannula in the duct, as in the Thomas cannula. This cannula involves minimal separation of the pouch and the duodenum, so that there is no risk of interference with the blood or nerve supply of the pancreas or duodenum by excessive distraction as in some other techniques.

3732 THE EFFECT OF RAW SOYBEAN ON THE PANCREAS OF ADULT DOGS. (E.) Patten, J. R. (U. Texas Dent. Branch, Houston), E. A. Richards and H. Pope, II. *Proc. Soc. Exp. Biol. Med.* 137(1):59-63, 1971.

Adult dogs fed either 15 or 30% soybean diet did not show any evidence of pancreatic enlargement or increased body weight. The level of trypsinogen, chymotrypsinogen and lipase were depressed in dogs fed 15% soybean for 2, 3, 5, and 8 weeks, but in dogs sacrificed after week 12, the enzymatic activity was the same as that of controls. Apparently, adaption of the pancreas to the dietary stimulus took place between weeks 8 and 12. There probably was a decreased synthesis of the above enzymes rather than an increased secretion in response to the soybean diet. The effects of raw soybean on the dogs in the present study differ from the increased level of enzymes reported in rats and chicks.

3733 THE EXOCELLULAR LIPASE FROM Rhizopus arrhizus. (E.) Noma, A. (U. Lund Chem. Ctr., Sweden) and B. Borgström. *Scand. J. Gastroenterol.* 6(3):217-223, 1971.

The course of hydrolysis of triolein catalyzed by the mold, Rhizopus arrhizus (Ra) lipase has the characteristics of an enzyme specific for the primary ester bands of the substrate. The diglyceride formed was entirely of the 1,2-configuration, and the monoglyceride accumulates in the reaction product; at neutral and acid pH values, it is almost completely in the 2-mono-form. The specificity, in this respect, was similar to that of pancreatic lipase. Bile salt in the form of sodium taurodeoxycholate did not inhibit the lipase at the concentration range used (3-24 mM) at pH 6.0. Sodium taurodeoxycholate shifted the pH optimum to slightly acid conditions with triglyceride substrate. The mold lipase was more stable than pancreatic lipase to acid conditions; the latter enzyme is completely inactivated at pH 4.0 for 1 hr. At this pH the mold lipase has a half life of 30 hr. Mold lipase and pancreatic lipase are very similar in their mode of action and respond in a similar way to the presence of bile salt. R. arrhizus lipase may be a worthwhile substitute for pancreatic lipase in medicine.

3734 THE INHIBITORY EFFECT OF FENFLURAMINE ON PANCREATIC LIPASE ACTIVITY. (E.) Dannenburg, W. N. (A. H. Robins Co. Dept. Pharmacol. Res., Richmond, Va.) and J. W. Ward. *Arch. Int. Pharmacodyn. Ther.* 191(1):58-65, 1971.

In vitro, 10.0 but not 0.1 and 1.0 mM concentrations of fenfluramine inhibited free fatty acid release by pancreatic lipase. The inhibition of lipase by fenfluramine was typical of irreversible inhibition. Fenfluramine inhibition relative to controls was dependent upon the level of lipase activity, interaction between the 2 being highly significant. Undialyzed preparations of the lipase extract containing fenfluranine were inhibitory, whereas after dialysis, activity was partially restored indicating that not true but pseudo-irreversibility was present. A comparison of in vitro with in vivo data supported the concept that decrements in body weight elicited by fenfluramine inhibition of pancreatic lipase was feasible and probably occurred by reducing intestinal absorption of fat.

3735 DOSE-RELATED RESPONSE OF PANCREATIC SYNTHESIS AND SECRETION TO CHOLECYSTOKININ-PANCREOZYMIN. (E.) Leroy, J., J. A. Morisset and P. D. Webster (VA Hosp., Augusta, Ga.). *J. Lab. Clin. Med.* 78(1):149-157, 1971.

L-phenylalanine-^{14}C incorporation per mg protein increased linearly following doses of 1 through 4 Ivy units of cholecystokinin-pancreozymin administered to rats. Doses ranging from 1 to 8 U./kg body weight were associated with progressive decreases in amylase content. Pancreozymin in doses of 30 and 120 U resulted in a paradoxical effect in that larger doses were associated with decreased amino acid-^{14}C incorporation into protein as well as decreased amylase secretion. When studying effects of cholecystokinin-pancreozymin on pancreatic acinar cell metabolism, 3 variables should be observed carefully: the nutritional state of the animal, the route of administration of the hormone and the dose of the hormone used.

3736 STUDIES ON IN VITRO ACTIVATION OF HIGH MOLECULAR WEIGHT PANCREATIC LIPASE. (E.) Santhanam, K. (Indiana U. Sch. Med., Indianapolis) and S. R. Wagle. *Biochem. Biophys. Res. Commun.* 43(6):1369-1375, 1971.

In porcine pancreatic preparations a 60% stimulation of lipase activity was observed in the complete system with or without protein kinase. The activation was completed by the addition of cyclicAMP, Mg and ATP to the porcine pancreatic supernatant fraction. The supernatant fraction apparently had enough endogenous protein kinase, since no further activation could be observed by its addition. With 40-fold purified lipase, there was a 40% increase in specific activity when protein kinase, cAMP, ATP and Mg were added to the system; however, when kinase was omitted, only 27% activation was observed. Both kinase and ATP are apparently essential for activation of purified lipase. However, Ca, though by itself not stimulatory, together with cAMP gave a maximum activation of 90%. A 120% stimulation of lipase activity was observed in homogenates of epididymal fat pads by the addition of various cofactors.

3737 THE ACTIVATION, PURIFICATION AND PROPERTIES OF RAT PANCREATIC JUICE PHOSPHOLIPASE A^2. (E.) Arnesjö, B. (U. Lund Chem. Ctr., Sweden) and A. Grubb. *Acta Chem. Scand.* 25(2):577-589, 1971.

Active phospholipase A^2 (phosphatide acyl-hydrolase EC 3.1.1.4) was obtained following the digestion of rat pancreatic juice prophospholipase with trypsin in concentrations above the trypsin inhibitory activity of the juice. The added trypsin and the tryptically activated proteolytic zymogens progressively inactivated the released phospholipase A. Heating at 75° C in the absence of Ca completely destroyed this potential phospholipase A degrading activity in the juice. Concentrated trypsin in the absence of Ca activated the heat (75° C)-resistant prophospholipase. The phospholipase A^2 was purified 150-200 times and was chromatographically homogenous. About 0.6% (w/v) of the pancreatic juice proteins was free and activable phospholipase A^2. The active enzyme, which hydrolyzes exclusively the β fatty acid ester linkage of lecithin was inactive in the absence of Ca and bile salts. Optimum activities were found at pH 8-9 and substrate inhibition occurred at low concentrations of lecithin. Trasylol (protease inhibitor) inhibited the enzyme activity probably by interaction with the bile salt anions, with consequent interference with the solubilization of the lecithin substrate.

3738 RAT PANCREATIC HYDROLASES FROM BIRTH TO WEANING AND DIETARY ADAPTATION AFTER WEANING. (E.) Robberecht, P. (Brussels U. Sch. Med., Belgium), M. Deschodt-Lanckman, J. Camus, J. Bruylands and J. Christophe. *Am. J. Physiol.* 221(1):376-381, 1971.

3739 EFFECTS OF GASTROINTESTINAL HORMONES ON SERUM IMMUNOREACTIVE INSULIN AND INSULIN-LIKE ACTIVITY IN NORMAL AND PANCREATECTOMIZED DOGS. (E.) Diaco, J. F. (U. Pennsylvania Sch. Med., Philadelphia), L. D. Miller and P. T. Kuo. *Rev. Surg.* 27(6):451, 1970.

See also numbers: 3648, 3710

3740 PROLIFERATION OF HEPATIC PARENCHYMAL CELLS IN IMMUNE-NEPHRITIC RATS. (E.) Saito, S. (Osaka U. Inst. Protein Res., Japan). *Virchows Arch.* [*Zellpathol.*] 8(2):162-171, 1971.

Following the administration of rabbit antikidney antibody, immune nephritic rats showed hepatic cell proliferation and enhanced incorporation of thymidine into DNA. There was a significant increase in the mitotic activity with a maximum at around hour 35, which appeared to return to normal by 170 hr after injection of the nephrotoxic γ-globulin. The kidney or kidney function was involved in the chain of events which lead to hepatic cell proliferation in immune nephritic rats. Hepatic hypertrophy of the nephritic rats was estimated to be about 30%. The leakage of protein (higher in the early stage of the disease) amounted to 150-170 mg/day/100 g body weight. The liver should compensate for the loss of protein and other serum constituents, so that the burst of cell proliferation can be taken as an adaptation of the liver to the new conditions brought about by antikidney antibody.

3741 GROWTH HORMONE RELEASE AFTER HEPATECTOMY. (E.) Echave Llanos, J. M. (La Plata Nat. U. Sch. Med. Sci., Argentina), C. L. Gómez Dumm and J. M. Surur. *Experientia* 27(5):574-575, 1971.

Four groups of 8 intact mice were injected with one of the following solutions: buffered saline, plasma from intact mice, plasma from hepatectomized mice killed at midnight of the second day postoperatively, and growth hormone. Plasma of hepatectomized, but not intact mice stimulated the synthesis of DNA in hepatocytes as well as litoral cells of the intact adult mouse liver. Pure bovine growth hormone strongly stimulated DNA synthesis in both cell populations. The labeled hepatocyte nuclei in animals injected with hepatectomized mouse plasma or growth hormone appeared in the periportally-located areas. The effect of plasma from hepatectomized mice is apparently due to its higher content in growth hormone, hence the existence of a hypothetical growth stimulating factor from liver origin is no longer necessary to explain the stimulation of mitotic activity or DNA synthesis in the nonoperated partner of a parabiotic or cross-circulation pair.

3742 STRESS AND THE STATE OF ACTIVATION OF THE NEUTRAL PROTEINASES OF RAT LIVER. (E.) Umana, C. R. (U. Minnesota Sch. Dent., Minneapolis). *Proc. Soc. Exp. Biol. Med.* 137(2): 385-387, 1971.

The proteolytic activity of the liver of nonstressed rats was significantly increased after the addition of exogenous ATP. The effect of the acute stress produced by complete body restraint was to decrease the level of activity of the neutral proteinases. The addition of exogenous ATP restored the activity of the neutral proteinases in the liver homogenates. The fact that stress situations produced a large release of steroids able to increase the rate of protein synthesis in the liver has suggested that the decreased proteolytic activity could be due to a decreased availability of the proteinase activator, at this point thought to be the aspartyl adenylate.

3743 THE EFFECT OF NEONATAL ADMINISTRATION OF TESTOSTERONE AND OESTRADIOL ON THE LIVER NUCLEAR VOLUME OF MALE AND FEMALE RATS. (E.) Toh, Y.-C. (U. Liverpool Clin., England). *Experientia* 27(5):576-577, 1971.

Untreated adult males had a significantly greater liver nuclear volume than the females. Neonatal injection (24 hr after birth) of testosterone produced no effect in males but significantly increased the nuclear volume in female rats, whereas estradiol caused a drop both in males and in females. Castration reduced the nuclear volume and the full volume could be restored by neonatal treatment with testosterone. The greater nuclear volume of males was apparently due to a higher frequency of tetraploid and octaploid nuclei. In females, the liver was predominantly unimodal, presumably diploid. A single injection of testosterone significantly increased the tetraploid and octaploid populations in female, but not male, rats. Estradiol reduced the number of big (polyploid) nuclei in both male and female rats. It was previously reported that hypophysectomy interrupted the progress of polyploidization in the liver nuclei and suggested that the effect of sex steroids was mediated via the pituitary rather than by direct action on the liver.

3744 KINETICS AND POOL SIZE OF PRIMARY BILE ACIDS IN MAN. (E.) Vlahcevic, Z. R. (VA Hosp., Richmond, Va.), J. R. Miller, J. T. Farrar and L. Swell. *Gastroenterology* 61(1): 85-90, 1971.

^{14}C-cholic acid and ^{14}C-chenodeoxycholic acid were simultaneously administered orally to 10 subjects. Chenodeoxycholic acid had a significantly slower turnover rate than cholic acid. The average daily production of cholic acid was higher (333 mg) than that of chenodeoxycholic acid (162 mg/day). The cholic acid pool was significantly larger than the chenodeoxycholic acid pool. These results suggest that chenodeoxycholic acid may be more efficiently reabsorbed from the small intestine than cholic acid. Information on the pool size and kinetics of chenodeoxycholic acid in the normal subject will serve as a useful base for additional studies on the metabolism of chenodeoxycholic acid in patients with acute and chronic liver disease.

3745 EVIDENCE FOR ETHYLATION OF RAT LIVER DEOXYRIBONUCLEIC ACID AFTER ADMINISTRATION OF ETHIONINE. (E.) Swann, P. F. (Middlesex Hosp. Med. Sch., London), A. E. Pegg, A. Hawks, E. Farber and P. N. Magee. *Biochem. J.* 123(2): 175-181, 1971.

DNA isolated from the livers of rats that had received a large dose of ^3H labeled L-ethionine 18 hr before death was found to contain a small amount of radioactivity. This radioactivity was not due to contamination of the isolated DNA with labeled protein, RNA, S-adenosyl-L-ethionine or L-ethionine. Almost all of the radioactivity present in acid hydrolyzed DNA isolated from that liver treated with labeled L-ethionine, was found in a fraction with similar chromatographic properties to 7-ethylquanine. Comparable doses of L-methionine did not lead to the formation of 7-methylquanine in the liver DNA. The demonstration that ethionine does react with the DNA of the tissue in which it can produce tumors implies that DNA cannot be ruled out as the target molecule of this carcinogen.

3746 THE EFFECTS OF SALICYLATE ON THE ACTIVITY OF RAT LIVER TRYPTOPHAN PYRROLASE IN VITRO AND IN VIVO. (E.) Bakawy, A. A.-B. (King's Coll. Hosp. Med. Sch., London) and M. J. H. Smith. *Biochem. J.* 123(2):171-174, 1971.

Salicylate (400 mg/kg, i.p.) caused an initial decrease in rat liver tryptophan pyrrolase activity in vivo at 30 and 60 min, the activity was restored at 2 hr, increased to 6-fold at 5 hr and fell to normal after 12 hr. Cycloheximide abolished the increased enzyme activity caused by cortisol, tryptophan and salicylate, whereas pretreatment with actinomycin D inhibited the induction of the enzyme by cortisol only. The effects of combined injection of salicylate and cortisol were additive, whereas those of salicylate plus tryptophan were not. Salicylic acid, in concentrations of 0.05 mmM and above, significantly inhibited the basal activity of tryptophan pyrrolase in rat liver homogenates. The inhibitory effect of salicylate was considerably decreased in the presence of hematin. Salicylate induces rat liver tryptophan pyrrolase activity in vivo by displacing tryptophan from its binding sites to circulating and liver proteins.

3747 EFFECT OF REGENERATING OR REGENERATED LIVER CELLS ON THE DEVELOPMENT OF TOLERANCE TO PENTOBARBITAL. (E.) Singh, J. M. (Xavier U. Coll. Pharm., New Orleans, La.). *Arch. Int. Pharmacodyn. Ther.* 190(2):347-353, 1971.

Tolerance to pentobarbital was developed in controls but not in partially hepatectomized (70% removed) rats 48 hr postoperatively. Tolerance to the drug was observed 72 hr after partial hepatectomy. The complete regeneration of liver cells occurred between 240 and 576 hr. At 72 hours after surgery, regeneration of the liver was significantly greater as compared to 48 hours as indicated by the percentage ratio between partially hepatectomized and control animals. Tolerance to pentobarbital apparently depends upon the regenerating or regenerated liver cells. At 48 hr after partial hepatectomy, instead of exhibiting tolerance, animals showed a cumulative hypnotic effect.

3748 ALTERATION OF DRUG METABOLISM DURING RAT LIVER REGENERATION. (E.) Henderson, P. T. (U. Nijmegan Fac. Med., Netherlands) and K. J. Kersten. *Arch. Int. Pharmacodyn. Ther.* 189(2):373-375, 1971.

In vitro activities of the p-hydroxylation of aniline and the N-demethylation of aminopyrine were measured at different intervals during regeneration following partial hepatectomy. The rates of conversion of aniline and aminopyrine were leveled down between 20 and 60 hr postoperatively to a minimum corresponding with the period of rapid growth of the liver, represented by a high mitotic activity. Thereupon, an increase of the enzymatic activities could be observed concurring with the decline of cellular proliferation. Pretreatment of rats with phenobarbital during 2 days following partial hepatectomy resulted in a redoubling of the hepatic p-hydroxylating and N-demethylating activities measured 40 hr after the operation. Drug-metabolizing activities can be induced even during a period of rapid liver growth, which may indicate that the decreasing effect owing to liver proliferation and phenobarbital induction act through different mechanisms.

3749 COPPER AND MOLYBDENUM IN SUBCELLULAR FRACTIONS OF RAT LIVER. (E.) Mills, C. F. (Rowett Res. Inst., Bucksburn, Aberdeen, Scotland) and R. L. Mitchell. *Br. J. Nutr.* 26(1):117-121, 1971.

Rats were given a Cu-deficient diet (group A) or diets providing 3 ppm Cu with sulfate (group B), molybdenum (group C), molybdenum plus sulfide (group D) or molybdenum plus sulfate. Animals fed Cu-deficient diets had a significantly lower rate of weight gain and a decline in blood hemoglobin concentration. Molybdate supplementation produced similar adverse effects on growth but not on hemoglobin concentration. Molybdate and sulfide supplementation of the diet providing 3 ppm Cu adversely affected both growth rate and hemoglobin concentration. Cu deficiency induced by diet A markedly reduced the Cu content of the supernatant id mitochondria + microsome fractions of the ver compared with values in diet E. The pres- ice of molybdate in diets B, C and D increased ɔth the molybdate and the Cu content of all ver fractions, and here the effects were reatest on diet B which included no sulfide or ılfate supplement. There may be a decrease in ne metabolic availability of Cu within tissues ; a response to molybdate accumulation without, ecessarily, a decrease in total tissue Cu oncentration.

750 MORPHOLOGY AND FUNCTION OF CELLS OF HUMAN EMBRYONIC LIVER IN MONOLAYER ILTURE. (E.) Bissell, D. M. (Boston City Hosp., ass.) and J. G. Tilles. *J. Cell Biol.* 50(1): 22-231, 1971.

orphologically, monolayer cultures of human iver cells were large and cuboidal and had elatively small, nuclei and prominent nucleoli. ith advanced growth, the cells retaining the ame physical features, secondarily formed cords nd acinus-like structures. Liver cell function as demonstrated both by the quantity of albumin eleased into the medium and by histochemical emonstration of the presence of glycogen and Fe ithin the cells. Supplementation of the medium ith calf or human serum led to rapid proliferation n the early (45 hr) phase, but this proliferation as clearly associated with attenuation of primary and secondary morphology and early loss of unction in the late phase. Serum-free medium ielded relatively slow early phase growth, lthough there was subsequent development of econdary morphology and a prolongation of full iver cell function for at least 4 wk.

751 DRUG METABOLISM IN LIVER AND IN SOME NON-HEPATIC TISSUES OF PARTIALLY IEPATECTOMIZED RATS. (E.) Manzo, L. (U. Pavia Dept. Pharmacol., Italy), M. De Bernardi, A. errara and F. Berté. *Pharmacol. Res. Commun.* 2(4):277-283, 1970.

The metabolism of oxazepam and aminopyrine was studied in vitro in partially hepatectomized and sham-operated rats 48, 96 and 192 hr after surgery. Drug metabolism was studied in the supernatant fraction of homogenized liver tissue. Aminopyrine metabolism was studied by measuring the amount of 4-aminoantipyrine and 4-acetylaminoantipyrine formed. Oxazepam metabolism was studied by the formation of oxazepam glucuronide in the incubation mixture. Results showed significant impairment of oxazepam glucuronidation in livers examined 48 hr after hepatectomy. No difference in the hepatic metabolism of aminopyrine was observed. Sham-operated and control animals did not show statistical differences though sham-operation resulted in the decrease of some enzyme activity. Aminopyrine and oxazepam metabolism in kidney, brain and lung was not found to be altered by partial hepatectomy.

3752 BILE ACID METABOLISM IN MAMMALS. I. BILE ACID-INDUCED INTRAHEPATIC CHOLESTASIS. (E.) Fisher, M. M. (U. Toronto Banting Inst., Ontario, Canada), R. Magnusson and K. Miyai. *Lab. Invest.* 25(1):88-91, 1971.

The influence of certain bile acids on bile production was studied by using isolated rat liver perfusion techniques. Following 2 hours of perfusion with whole rat blood 30 μM of each bile acid (cholic acid, lithocholic acid, and chenodeoxycholic acid, singly or in combination) in lecithin was added to the perfusion medium. Metabolism of taurocholic and glycolithocholic acids and their 3α-sulfate esters were also studied. Chenodeoxycholic acid and lithocholic acid were found to be cholestatic and produced total cessation of bile flow. The cholestatic effect of lithocholic and chenodeoxycholic acids were overcome by the addition of cholic acid in the perfusion medium. Taurocholic acid and glycolithocholic acid also induced cholestasis. The 3α-sulfate ester of taurolithocholic acid reduced the bile production by 50% while the sufate ester of glycolithocholic acid induced marked but not complete cholestasis.

3753 INDUCERS OF INTERFERON INHIBIT THE MITOTIC RESPONSE OF LIVER CELLS TO PARTIAL HEPATECTOMY. (E.) Jahiel, R. I. (New York U. Sch. Med., N. Y.), D. Taylor, N. Rainford, S. E. Hirschberg and R. Kroman. *Proc. Natl. Acad. Sci. USA* 68(4):740-742, 1971.

Inducers of interferon (poly I-C, Newcastle disease virus, and statolon) all markedly inhibited the mitotic response of hepatic cells in mice following partial hepatectomy. Hence, interferon inducers inhibited the division of a nonneoplastic, nonaneuploid mammalian cell. The only common component in the 3 inducers was RNA. The antimitotic effect observed in the present experiments may be representative of a very general antimitotic effect of the inducers of interferon, or it may be limited to cells that divide only after certain stimuli, like salivary epithelium and liver cells. The inducers might be capable of limiting excessive or undesirable multiplication of cells, for instance in hyperplastic changes or precancerous cell proliferation.

3754 THE INTRACELLULAR pH OF THE ISOLATED PERFUSED RAT LIVER. (E.) Calvey, T. N. (U. Liverpool Dept. Pharmacol., England). *Experientia* 27(5):543, 1971.

Intracellular pH was determined from the distribution of labeled dimethadione in the isolated perfused rat liver. Results were compared with equilibrium values of cell pH, which were calculated from published estimates of the potential difference across the liver cell membrane. At an external pH of 7.40 ± 0.01 and a

pCO_2 of 35-37 mm Hg, the intracellular pH of the normal rat liver cell at 35° C was 7.17 ± 0.09. In 4 experiments, individual values for internal cell pH ranged from 7.09-7.30. Intracellular pH was approximately 0.2 pH units higher than the values consistent with electrochemical equilibrium. This difference may be related to the presence of relatively alkaline mitochondria (20% of total intracellular volume) in the liver cell.

3755 EFFECT OF PHENOBARBITAL ON BILE FLOW AND BILE SALT EXCRETION IN THE RAT. (E.) Paumgartner, G. (Univ. 2nd Med. Clin., Vienna, Austria), W. Horak, P. Probst and G. Grabner. *Nauyn Schmiedebergs Arch. Pharmakol.* 270(1):98-101, 1971.

Phenobarbital treatment induced a significant increase in bile flow in rats. The output of total bile acids was not significantly increased during phenobarbital-induced choleresis, a finding which does not exclude the possibility of changes of the relative synthesis and excretion rates of individual bile acids. No change in the relative amounts of individual bile acids was observed, which may be evidence against an induction of hydroxylases involved in the biosynthesis of primary bile acids. It has been previously shown that 7α-hydroxylase and 12α-hydroxylase, enzymes involved in the conversion of cholesterol to taurocholic acid, are not induced by phenobarbital.

3756 IMMEDIATE EFFECTS OF SHORT-TERM HEPATIC AND SPLANCHNIC ISCHEMIA IN PIGS. (E.) Almersjö, O. (Sahlgrenska Hosp., Goteborg, Sweden), S. Bengmark, L. Domellöf and L. Hafström. *Am. J. Surg.* 122(1):91-94, 1971.

Hematocrit, blood sugar level and oxygen saturation remained unchanged during a 15-min period of occlusion of the celiac axis, mesenteric artery and portal vein and after reestablishment of flow. Arterial and portal pressures returned to preocclusion levels after release of the occlusion. The pCO_2 level was significantly lowered in the arterial blood during occlusion and then a low pH of 6.99 was measured in the portal blood following reestablishment of circulation. Sodium and chloride levels were unchanged throughout the study, while potassium concentration was significantly increased during occlusion in both arterial and portal blood. Suprahepatic caval vein potassium was greater than infrahepatic caval vein potassium during occlusion. After release, potassium concentration in the portal and infrahepatic caval blood was further increased. An increasing lactic acid concentration was observed throughout the experiment and pyruvic acid increased significantly in arterial and suprahepatic caval vein blood during occlusion.

3757 STUDIES ON HUMAN BILE. V. INFLUENCE OF CHOLESTYRAMINE TREATMENT ON THE COMPOSITION OF BILE IN HEALTHY SUBJECTS. (E.) Dam, H. (Univ. Hosp., Copenhagen, Denmark), I. Prange, M. Krogh Jensen, H. E. Kallehauge and H. J. Fenger. *Z. Ernaehrungswiss.* 110(3): 188-197, 1971.

Serum cholesterol showed a slight to moderate decrease and was lower after 6 weeks than after 3 weeks following administration of cholestyramine, while the molar percentage of glycocholic acid in total bile acid increased markedly. The molar percentage of glycodeoxycholic acid, glycochenodeoxycholic acid or taurocholic acid in total bile acids were decreased. As a consequence of the above mentioned changes, the glycine:taurine conjugation ratio was generally increased and the molar ratio dihydroxycholanoic acid:trihydroxycholanoic acid decreased. The mean values of the molar ratios between total bile acids and cholesterol and between lipid-soluble phosphorus and cholesterol were slightly to moderately decreased. Apparently, increased solubility of cholesterol in the bile is not a consequence of cholestyramine treatment, which in this study seem to point in the opposite direction.

3758 BINDING OF LIPID BY SOLUBLE AND MEMBRANE PROTEINS ISOLATED FROM RAT LIVER. (E.) Fidge, N. H. (Australian Nat. U. John Curtin Sch. Med. Res., Canberra). *Aust. J. Exp. Biol. Med. Sci.* 49(2):153-165, 1971.

Although 12-19% of the total rat hepatic membrane protein present was bound to lipid compared with 6-11% of the soluble protein, the ratio of lipid to protein present in the incubation mixture influenced the extent of protein binding. The binding of liver protein (not plasma proteins) to lipid, as measured in these experiments, was due to specific binding of liver proteins with lipid, rather than the result of nonspecific adsorbance. Alterations of the phospholipid:neutral lipid ratios apparently influenced the amount of protein bound, and the lipid-protein interaction was found to be dependent on time and temperature.

3759 BEHAVIOR OF OPPOSING PATHWAYS OF THYMIDINE UTILIZATION IN DIFFERENTIATING, REGENERATING, AND NEOPLASTIC LIVER. (E.) Ferdinandus, J. A., H. P. Morris and G. Weber (Indiana U. Sch. Med., Indianapolis). *Cancer Res.* 31(5):550-556, 1971.

The incorporation of thymidine into DNA (synthetic metabolic pathway) increased and concurrently the degradation to CO_2 (catabolic pathway) decreased parallel with hepatoma growth rate in rats. The ratio of the activities of the synthetic:catabolic pathways correlated closely with hepatoma growth rate. These observations further support the previously reported Molecular Correlation Concept. Thymidine incorporation was very high in newborn rat liver and gradually decreased during differentiation to very low evels in the adult. In contrast, the catabolic tilization of thymidine was high in the newborn nd it increased further during differentiation. ollowing partial hepatectomy the activity of the ynthetic pathway increased, while that of the atabolic pathway decreased. The activities of he opposing pathways of thymidine utilization ubsequently returned to nearly normal range, pproaching the previous adult level at about 96 r.

760 BILIARY SECRETION OF ROSE BENGAL IN THE DOG. (E.) Varga, F. (Univ. Med. Sch., ecs, Hungary) and E. Fischer. *Acta Physiol. cad. Sci. Hung.* 38(2-3):143-149, 1970.

ollowing common bile duct infusion of a low dose f rose bengal (0.1 mg/kg/min), 35.8% of the dose as in the liver, compared to only 6.4% retained n the liver following a higher dose (1.2 mg/kg/min). n other organs (kidney, small intestine, muscle) he concentration of rose bengal increased in roportion with the increasing dose, and no sign f saturation was observed. The hepatic storage alue of rose bengal determined quantitatively as 571 μg/g. The hepatic transport maximum of ose bengal (32 μg/kg/min) and its ability to nhibit bile flow are characteristics that it hares with indocyanine green. In the liver, ose bengal apparently inhibits some phase of the ctive secretion processes and this results in a ecrease of bile production.

761 EFFECTS OF AGE AND SEX ON ^{3}H-CORTISOL UPTAKE, BINDING AND METABOLISM IN IVER AND ON ENZYME INDUCTION CAPACITY. (E.) inger, S. (Temple U. Sch. Med., Philadelphia, a.) and G. Litwack. *Endocrinology* 88(6):1448-1455, 971.

he effects of age and sex upon the uptake, etabolism, and binding of ^{3}H-cortisol and the nduction of tyrosine aminotransferase in the at liver was studied. Cortisol concentration y the liver was only 20% as effective in fetal 1 day before term) as in adult livers, while nly 9% as much cortisol was bound by fetal epatic cytosol proteins. In 1-day-old rats, ormone uptake and binding was close to adult evels. Chromatography on DEAE Sephadex A-50 evealed 3 peaks corresponding to cortisol etabolite binding proteins I, II and III. Although the amount of radioactivity in Binder I as constant regardless of age, the relative mounts of radioactivity in Binders II and III ere reversed from the adult pattern. Hepatic tyrosine aninotransferase levels were not ffected by cortisol injection up to 11 days fter birth, after which they were increased 2.2-, 3.1- and 5.2 fold when cortisol was administered on days 15, 26, and 39, resp. While female rats produced only 1 anionic derivative in the etabolism of cortisol, male rats produced a mall amount of a nonanionic compound, and larger amounts of 3 anionic derivatives. Fetal rats did not produce any of these metabolites but did, however, produce tetrahydrocortisol.

3762 DISAPPEARANCE OF GASTRIN AND PENTAGASTRIN IN THE PORTAL CIRCULATION. (E.) Temperley, J. M. (Univ. Coll. Hosp. Med. Sch., London), B. H. Stagg and J. H. Wyllie. *Gut* 12(5):372-376, 1971.

The inactivation of gastrin and pentagastrin by the liver and small bowel in dogs and rats was examined. Acid secretion rose when pentagastrin was infused into the jugular vein, and fell again to near basal levels when it was infused into the portal vein. Changing the site of gastrin infusions produced no such effect. During portal vein infusions of pentagastrin, secretion was only 13% of that during jugular vein infusions of this substance. Pentagastrin is apparently almost completely inactivated by passage through the liver, whereas gastrin is unaffected. In vitro studies with rat liver and small bowel mucosal homogenates supported the above finding. Gastrin was inactivated more than 20 times as rapidly by small bowel mucosa as by liver. Rat liver and small bowel mucosa apparently contain enzymes capable of inactivating pentagastrin and gastrin at different rates.

3763 METABOLISM OF PHOSPHATIDYL CHOLINE, PHOSPHATIDYL ETHANOLAMINE AND SPHINGOMYELIN IN REGENERATING RAT LIVER. (E.) Fex, G. (U. Umea Dept. Chem., Sweden). *Biochim. Biophys. Acta* 231(1):161-169, 1971.

3764 A STUDY OF A TYROSINE AMINOTRANSFERASE INACTIVATING SYSTEM IN RAT LIVER HOMOGENATE. (E.) Auricchio, F. (U. Naples Inst. Gen. Pathol., Italy) and A. Liguori. *FEBS Let.* 12(6):329-332, 1971.

3765 IN VITRO CULTURE OF DIFFERENTIATED HUMAN HEPATIC CELLS. (It.) Armato, U. (U. Inst. Anat. Human Morphol., Padua, Italy), G. Bellandi and C. Eccher. *Boll. Soc. Ital. Biol. Sper.* 46(17):717-719, 1970.

3766 STUDIES ON HUMAN BILE. IV. INFLUENCE OF INGESTION OF CHOLESTEROL IN THE FORM OF EGGS ON THE COMPOSITION OF BILE IN HEALTHY SUBJECTS. (E.) Dam, H. (Polytech. Inst., Copenhagen), I. Prange and M. Krogh Jensen. *Z. Ernaehrungs Wiss.* 10(3):178-187, 1971.

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3788 SUBUNIT WEIGHT AND N TERMINAL GROUPS OF LIVER AND KIDNEY CARBOXYLESTERASES (EC 3.1.1.1). (E.) Heymann, E. (Christian Albrechts U. Inst. Physiol., Kiel, Germany), W. Junge and K. Krisch. *Febs Lett.* 12(4):189-193, 1971.

3789 MAMMALIAN PEPTIDE CHAIN TERMINATION. II. CODON SPECIFICITY AND GTPase ACTIVITY OF RELEASE FACTOR. (E.) Beaudet, A. L. (NIH Bethesda, Md.) and C. T. Caskey. *Proc. Natl. Acad. Sci. USA* 68(3):619-624, 1971.

3790 THE UPTAKE OF CHYLOMICRON FATTY ACIDS BY THE HUMAN LIVER AND THE TURNOVER OF DIETARY FATTY ACIDS WITHIN THE ENDOGENOUS FATTY ACID CYCLE. (Ger.) Oette, K. (Univ. Med. Clin., Cologne, Germany), W. Frese and R. Phlippen. *Z. Gesamte Exp. Med.* 154(3):208-223, 1971.

See also numbers: 3646, 3710, 3851, 4412

INTESTINE

3791 ISOLATION OF THE AQUEOUS PHASE OF HUMAN INTESTINAL CONTENTS DURING THE DIGESTION OF A FATTY MEAL. (E.) Porter, H. P. and D. R. Saunders (U. Washington Dept. Med., Seattle). *Gastroenterology* 60(6):997-1007, 1971.

A technique is presented for isolating the aqueous phase of intestinal contents without the artifacts which are created by heating to 70° C for 10 min to inactivate pancreatic lipase and spinning the heated sample at 100,000 g for 15-18 hr to separate the aqueous phase from the oily phase. The artifacts created by the latter method include increased free fatty acid and altered phospholipid composition due to heating, and the concentration gradients created by spinning which makes random sampling misleading. The new technique involves filtration through 2 series of Millipore filters. More than 95% of the triglyceride of intestinal contents was removed by the first set of filters with the smallest pore diameter being 3,000 Å. When this filtrate was passed through the second series of filters, (smallest pore diameter 1000 Å), the filtrate was clear or slightly turbid, and contained 89.7% of the bile salts of unfiltered intestinal contents. The micellar association between cholesterol and bile salt was not disrupted by filtration. Analysis of duodenal-jejunal contents after a fatty meal given to 9 normal subjects revealed 669 ± 106 μg/ml trypsin, 8.6 ± 1.4 mM bile salts, and 19.7 ± 4.7 mM of free fatty acids; the aqueous phase (1000 Å filtrate) contained 7.7 ± 1.3 mM bile salts and 10.8 ± 3.5 mM free fatty acid.

3792 ARGENTAFFIN AND OTHER "ENDOCRINE" CELLS OF THE SMALL INTESTINE IN THE ADULT MOUSE. II. RENEWAL. (E.) Ferreira, M. N. (McGill U. Dept. Anat., Montreal, Canada) and C. P. Leblond. *Am. J. Anat.* 131(3):331-339, 1971.

Following either a single injection or continuous infusion for 1 day of ^{3}H-thymidine, the major endocrine cells (biconcave, large spherical or small spherical granule cells) were not labeled. Moreover, mitosis in these cells was not observed; hence, cells of the above 3 types did not have the capacity to divide. However, at 1½ days, 4.7% of the endocrine cells had acquired label and they were located in the lower half of the crypts. At 3 days, labeled cells were found in villi for the first time, while their number increased in crypts. Granule number increased within large and small spherical granule cells. The percentage of labeled cells reached 60% after 4 days and over 80% after 6-8 days of continuous infusion. These 3 main endocrine type cells in mouse jejunum apparently arise from unidentified precursors in the lower half of the crypts. These precursors migrate from crypts to villi and are probably extruded from villus tips. Turnover time for the 3 cell types is the same (4 days), even though they all seem to evolve independently.

3793 LOCALIZATION OF FATTY ACID REESTERIFICATION IN THE BRUSH BORDER REGION OF INTESTINAL ABSORPTIVE CELLS. (E.) Robins, S. J. (Boston VA Hosp., Mass.), D. M. Small, J. S. Trier and R. M. Donaldson, Jr. *Biochim. Biophys. Acta* 233(3):550-561, 1971.

Fatty acid and triglyceride levels in isolated intestinal brush borders from hamsters fed pure oleic acid increased 3- to 5-fold. Increased fatty acids and triglycerides were also observed in the C band fraction of disrupted brush borders.

After everted sacs of hamster intestine were incubated for 30 sec in micellar solutions containing trace quantities of ^{14}C-oleic acid, approximately half the total radioactivity recovered from whole brush borders was present as triglyceride. The specific activities of all glyceride fractions extracted from the relatively pure preparations of microvillous membranes found in C band material were distinctly lower than those observed in whole brush borders or microsomes. However, the AB fraction contained glycerides with higher specific activities than those of whole brush borders or microsomes. Whole brush border fractions owe their activity for glyceride synthesis to a population of smooth membranes at the very apex of the cell which early in the absorptive process appear to synthesize triglyceride more actively than microsomes isolated by conventional sedimentation techniques from the whole intestinal cell.

3794 ATPase ACTIVITY IN RAT JEJUNAL EPITHELIAL CELL HOMOGENATE: ITS RELATION TO INTESTINAL SODIUM CHLORIDE ABSORPTION AND ITS CHANGE UNDER THE INFLUENCE OF SOME DRUGS. (E.) de Wolff, F. A. (U. Leiden Dept. Pharmacol., Netherlands), A. Suijkerbuijk-Van Beek, H. van Rees and E. L. Noach. *Arch. Int. Pharmacodyn. Ther.* 189(2):399-400, 1971.

Specific activity of total ATPase was measured at several constant levels of Na$^+$ concentration, varying the K$^+$ concentration. At Na$^+$ concentrations of 50, 100, 150 and 200 mM, the curves showed maximum enzyme activity where the Na:K ratio was 10:1. Diphenylhydantoin stimulated the enzyme activity in a medium containing Na$^+$ and K$^+$ in a ratio larger, but not smaller, than 10:1. This drug apparently acts on the K$^+$ site of the enzyme. Ouabain (2 mM) inhibited the enzyme in all cases. In the absence of Na$^+$ and K$^+$, the ATPase activity was higher than at 100 mM Na$^+$ and 5 mM K$^+$ which indicates that under some conditions Na$^+$ and K$^+$ are inhibitory to ATPase. Membrane-bound ATPase in this system does not absolutely require Na$^+$ and K$^+$.

3795 [^{3}H]ADENOSINE TRIPHOSPHATE: RELEASE DURING STIMULATION ON ENTERIC NERVES. (E.) Su, C. (U. California Sch. Med., Los Angeles), J. A. Bevan and G. Burnstock. *Science* 173(3994):336-338, 1971.

Although isolated strips of guinea pig taenia coli took up tritiated adenosine, AMP, ADP, and ATP to a considerable extent, tritiated inosine and adenine, possible metabolites of ATP, were concentrated to a much smaller degree. After uptake, approximately 60% of ^{3}H-adenosine was converted into and retained as [^{3}H]ATP; a smaller fraction was accountable as [^{3}H]AMP, [^{3}H]inosine, or cyclic [^{3}H]AMP, but virtually no [^{3}H]ADP was detected. When transmural stimulation was applied to 3 cm lengths of taenia coli incubated with ^{3}H-adenosine, a marked transient reduction of muscle tone was registered which was accompanied by a marked increase in overflow of tritium into the superfused fluid. ATP can apparently be synthesized from adenosine, stored as ATP (but not ADP) in the taenia coli, and released upon activation of both nonadrenergic and adrenergic inhibitory nerves. ATP may be the transmitter at these neuroeffector junctions.

3796 PEYER'S PATCHES: AN ENRICHED SOURCE OF PRECURSORS FOR IgA-PRODUCING IMMUNOCYTES IN THE RABBIT. (E.) Craig, S. W. (Johns Hopkins U. Dept. Biol., Baltimore, Md.) and J. J. Cebra. *J. Exp. Med.* 134(1):188-200, 1971.

In rabbits, the proliferative and differentiative potential of Peyer's patch, peripheral blood, and popliteal lymph node cells was assessed by allogeneic cell transfer followed by quantitation of donor immunocytes by immunofluorescence. Peyer's patches represented a source of lymphoid cells that had the potential to seed the gut and to proliferate and differentiate into IgA-producing cells. The greater capacity of Peyer's patch cells compared to popliteal lymph node cells in seeding the gut of recipient rabbits may be due to some intrinsic property which results in their having either a higher affinity than other lymph node cells for the gut tissue or a greater ability to proliferate there. The function of the Peyer's patches in the immune system may be to furnish IgA precursor cells or antigen reactive cells to the lamina propria of the small intestine, the mesenteric lymph nodes, and perhaps to other lymphoid tissues and secretory glands as well.

3797 DIETARY REGULATION OF GLYCOLYTIC ENZYMES. XI. EFFECT OF INHIBITORS OF PROTEIN SYNTHESIS ON THE ADAPTATION OF CERTAIN JEJUNAL GLYCOLYTIC AND FOLATE-METABOLIZING ENZYMES TO DIET AND SEX STEROIDS. (E.) Stifel, F. B. (Fitzsimons Gen. Hosp., Denver, Colo.), R. H. Herman and N. S. Rosensweig. *Biochim. Biophys. Acta* 237(3):484-489, 1971.

The activities of rat jejunal pyruvate kinase, fructose-1,6-diphosphate aldolase, serine hydroxymethyltransferase and methylenetetrahydrofolate dehydrogenase were highest in the fructose fed group, lower in the casein fed group and lowest in the fasted group. Ethionine or actinomycin administration with dietary fructose and casein significantly reduced the activities of all 4 enzymes. Oral estradiol or oral testosterone significantly increased the activities of each of the jejunal enzymes except fructose-1,6-diphosphate aldolase. The administration of ethionine or actinomycin significantly decreased the estradiol or testosterone-adaptive effects in the 3 enzymes but had no effect on aldolase. One type of control of the adaptive changes in the activities of certain jejunal glycolytic and folate-metabolizing enzymes apparently occurs at the level of DNA-dependent RNA synthesis.

3798 METABOLISM OF THE ENANTIOMERIC 1-O-ALKYL GLYCEROL ETHERS IN THE RAT INTESTINAL MUCOSA IN VIVO; INCORPORATION INTO 1-O-ALKYL AND 1-O-ALK-1'-ENYL GLYCEROL LIPIDS. (E.) Paltauf, F. (U. Graz Inst. Physiol. Chem., Austria). *Biochim. Biophys. Acta* 239(1):38-46, 1971.

Alkyl diacyl glycerols accounted for 0.25 mole % of the mucosa triglyceride fraction of rat intestinal mucosa. Equal amounts of radioactivity were retained in mucosa lipids 2 and 6 hr after administration of 1-O-(9,10,[$^3H_2$]octadecyl) sn-glycerol and 3-O-(1-[^{14}C]octadecyl) sn-glycerol. After 2 hr, while absorption is still occurring, a high proportion of radioactivity is associated with triglycerides; 6 hr after administration of substrates, when the ingested lipid is completely absorbed, the major part of mucosa lipid radioactivity resides in phospholipids. The ^3H:^{14}C ratio of alkyl glycerol ethers derived from alkyl diacyl glycerols greatly exceeds that of the ingested alkyl glycerol ethers. Apparently, there is a preferential acylation of the ^3H-labeled 1-O-octadecyl sn-glycerol with fatty acids, leading to the formation of an alkyl diacyl glycerol whose steric configuration is that of the naturally occurring alkyl glycerol lipids. Exogenous alkyl glycerol ethers are incorporated into alkyl and alk-1'-enyl phospholipids without prior cleavage of the ether bond.

3799 THE METABOLISM IN VITRO OF ENANTIOMERIC 1-O-ALKYL GLYCEROLS AND 1,2- AND 1,3-ALKYL ACYL GLYCEROLS IN THE INTESTINAL MUCOSA. (E.) Paltauf, F. (U. Graz Inst. Physiol. Chem., Austria) and J. M. Johnston. *Biochim. Biophys. Acta* 239(1):47-56, 1971.

Both 1- and 2- monoalkyl compounds could serve as acyl acceptors in the hamster intestinal mucosa, hence these substrates can be utilized for the biosynthesis of triglycerides. Rac 1,3- and rac 1,2-dialkyl glycerols were not utilized in the synthesis of triglycerides, but rac 1,3-alkyl acyl glycerol was a substrate. 1-3-diglyceride can be directly utilized for triglyceride biosynthesis without the necessity of isomerization to the 1,2 configuration. The enzyme, diglyceride transacylase utilized both the 1,2- and 1,3-diglyceride as substrates. 3-Octadecyl sn-glycerol was not acylated; however, 3-octadecanoyl sn-glycerol was utilized as a substrate for di- and triglyceride biosynthesis. The acylation reaction apparently requires an ester group in the 3 position or its potential formation in order for the substrate to be acylated.

3800 EFFECT OF THYROID STATUS ON INTESTINAL ALKALINE PHOSPHATASE LEVELS IN THE RAT. (E.) Watson, W. C. (U. Western Ontario Victoria Hosp., London, Canada) and J. F. Tuckerman. *Endocrinology* 88(6):1523-1525, 1971.

The effect of thyroid hormone on intestinal alkaline phosphatase levels was studied in male rats. Hypothyroidism was associated with diminished, and hyperthyroidism with increased alkaline phosphatase activity in the small intestine. Thyroxine was able to overcorrect this reduction in hypothyroid animals. Thyroxine administration raised the level of intestinal alkaline phosphatase independently of adrenocortical effects as shown in hyperadrenal and adrenalectomized animals.

3801 MAGNESIUM-ATPase AND SODIUM-POTASSIUM-ACTIVATED ATPase ACTIVITY IN THE PROXIMAL AND DISTAL SEGMENTS OF THE SMALL INTESTINE OF RATS DURING POSTNATAL DEVELOPMENT. (E.) Ternberg, J. L. (Washington U. Sch. Med., St. Louis, Mo.) and P. Lesker. *J. Pediatr. Surg.* 6(3):359-364, 1971.

Both magnesium-dependent ATPase and magnesium-dependent, sodium-potassium activated ATPase activities obtained from the distal half of the rat intestine were higher than those found for the proximal half during the first 3 weeks of life. Within 1 week of weaning, both the Na$^+$ K$^+$ ATPase and the Mg^{++} ATPase decreased precipitously in the distal intestine to a level that remained essentially unchanged at 21 weeks of age. The Mg^{++} ATPase and Na$^+$ K$^+$ ATPase activities in the proximal one-half of the intestine also decreased, but more gradually to the 8-week value, which remained unchanged at 21 weeks of age. Oubain at 1 mM/liter gave complete inhibition of the Na$^+$ K$^+$ ATPase activity for all age ranges. Results in this study conflict with previous observations of a relative and an absolute deficiency of stromal Na$^+$ K$^+$ ATPase in the red blood cells of term and premature human infants compared with adults, having similar reticulocyte counts.

3802 EPITHELIAL CELL KINETICS IN THE SMALL INTESTINE OF THE RAT 60 DAYS AFTER RESECTION OF 70 PER CENT OF THE ILEUM AND JEJUNUM. (E.) Hanson, W. R. and J. W. Osborne (U. Iowa Radiat. Res. Lab., Iowa City). *Gastroenterology* 60(6):1087-1097, 1971.

Sixty days after the resection of 70% of the ileum and jejunum of male Holtzman rats, cell population kinetic parameters were measured using antoradiography to determine whether the increased radioresistance of the residual bowel could have its basis in cell renewal changes. The S phase in all segments of small intestine from resected animals was reduced when compared with analogous segments in sham-resected animals. The generation time in segments of the upper jejunum and median small intestine was shorter in resected animals, however, in the lower ileum the generation time was longer. The mean number of cells per crypt section and the number of labeled cells per crypt section were significantly greater in resected animals. The migration rate of epithelial cells from crypts to villi was increased by 31% in resected rats.

3803 EPITHELIAL CELL MIGRATION IN THE ALIMENTARY MUCOSA OF THE SUCKLING PIG. (E.) Moon, H. W. (Nat. Anim. Dis. Lab., Ames, Iowa). *Proc. Soc. Exp. Biol. Med.* 137(1):151-154, 1971.

The time for complete replacement of small intestinal villus epithelium was approximately 3 times longer in 1-day-old than in 3-week-old pigs. Two days following injection with ^{3}H-thymidine, labeled epithelial cells had migrated to the base of the villi in the 1-day-old group and to or near the villus tip in the 3-week-old group. The villus length:crypt depth ratios were 9.4:1 in 1-day-old and 3.0:1 in 3-week-old pigs. Epithelia in the large intestine were also replaced more slowly in day old pigs. However, replacement times for the squamous epithelia in esophagus and stomach were similar for both age groups. The differences in small intestinal villus epithelium replacement times and villus length:crypt depth ratios between 1-day-old and 3-week-old pigs may contribute to the marked decrease in transmissible gastroenteritis case fatality rate with age.

3804 REGENERATION OF INTESTINAL MUCOSA AFTER IRRADIATION. (E.) Withers, H. R. (U. Texas M. D. Anderson Hosp., Houston). *Cancer* 28(1):75-81, 1971.

A regenerative response that restores the clonogenic population of the intestinal mucosa following radiation injury is slow in onset but rapid once begun. The delay is greater in colonic than in jejunal mucosa. The appearance of foci of regeneration in the upper third of the colonic crypts is consistent with the persistency of steady state cell migration patterns with some surviving clonogenic cells being rescued after leaving the usual proliferative zone in the lower two-thirds. During days 3 and 4 following irradiation, the clonogenic crypt cells of jejunum double every 8 hr or less, which is as rapid as new cells can be produced. The jejunal crypts are extensively depopulated within 24-36 hr of irradiation. Although clonogenic cell regeneration could be a slow response to destruction of the crypt, the coincidence of the villus shortening and clonogenic crypt cell regeneration suggests an alternative interpretation that the regenerative response is somehow related to villous integrity.

3805 THE MOLECULAR SPECIES OF MUCOSAL PHOSPHATIDYL CHOLINES FROM THE SMALL INTESTINE OF NORMAL AND ESSENTIAL FATTY ACID DEFICIENT RATS. (E.) Yurkowski, M. (U. Guelph Dept. Nutr., Canada) and B. L. Walker. *Biochim. Biophys. Acta* 231(1):145-152, 1971.

3806 THE EFFECT OF ANTIBIOTICS ON INTESTINAL SECRETION AND FERMENTATION AFTER ADMINISTRATION OF CAFFEINE OR BARBITAL. (Rus.) Govorovich, E. A. (A. V. Vishnevski Inst. Surg., Moscow) and L. V. Elagina. *Antibiotiki* 16(5): 458-463, 1971.

3807 INTESTINAL IMMUNITY. (Fr.) Bazin, H. (U. Louvain Dept. Exp. Med., Belgium). *Pathol. Biol. (Paris)* 18(23-24):1101-1106, 1970.

3808 IDENTIFICATION OF 1,25-DIHYDROXYCHOLECALCIFEROL, A FORM OF VITAMIN D3 METABOLICALLY ACTIVE IN THE INTESTINE. (E.) Holick, M. F. (U. Wisconsin Dept. Biochem., Madison, Wis.), H. K. Schnoes and H. F. DeLuca. *Proc. Natl. Acad. Sci. USA* 68(4):803-804, 1971.

3809 FACTORS INFLUENCING INTESTINAL CELL RENEWAL. A STATEMENT OF PRINCIPLES. (E.) Sprinz, H. (Walter Reed Army Inst. Res., Washington, D. C.). *Cancer* 28(1):71-74, 1971.

3810 TRYPTOPHAN-5-HYDROXYLASE IN RAT SMALL INTESTINE. (E.) Noguchi, T. (Wakayama Med. Coll., Japan), M. Nishino and R. Kido. *Life Sci.* [*II*] 10(10):583-589, 1971.

3811 DISCCHARIDASE ACTIVITY OF THE RAT SMALL INTESTINE: ITS RELATION WITH AGE AND FEEDING. (E.) Licastro, R. (Ninos Hosp., Buenos Aires, Argentina) and H. N. Toccalino. *Acta Gastroenterol. Lat. Am.* 2(4):189-193, 1970.

3812 INCORPORATION OF ^{32}P-ORTHOPHOSPHATE INTO PHOSPHOLIPIDS OF THE INTESTINE OF NORMAL RATS. (E.) Niemiro, R. (Med. Sch., Gdansk, Poland), L. Michalska and J. Wrobel. *Acta Biochim. Pol.* 18(1):21-30, 1971.

3813 PAPAVERINE-INDUCED INHIBITION OF PHOSPHODIESTERASE ACTIVITY IN VARIOUS MAMMALIAN TISSUES. (E.) Poch, G. (U. Dept. Pharmacol., Graz, Austria) and W. R. Kukovetz. *Life Sci.* [*I*] 10(3):133-144, 1971.

3814 THE MUCIGENOUS EFFECT OF A DUODENAL HORMONE ON THE DIGESTIVE TRACT. (Fr.) Svatos, A. (Saint Antoine Hosp., Paris) and J. Caroli. *C. R. Acad. Sci.* [*D*] *(Paris)* 272(8): 1130-1132, 1971.

3815 GLUCAGON STIMULATES INTESTINAL SECRETION. (E.) Barbezat, G. O. (Wadsworth VA Hosp., Los Angeles, Calif.) and M. I. Grossman. *Lancet* 1(7705):918, 1971.

See also numbers: 3627, 3649, 3713, 3762

3816 EFFECTS OF GLUCAGON ON THE SPLANCHNIC AND THE SYSTEMIC CIRCULATION. (E.) Madden, J. J., Jr. (U. Virginia Med. Ctr., Charlottesville), R. M. Ludewig and S. L. Wangensteen. *Am. J. Surg.* 122(1):85-90, 1971.

The i.v. injection of glucagon into dogs increased hepatic, celiac and superior mesenteric arterial blood flow and reduced the resistance in all of the vascular beds. The increase in blood flow to the splanchnic vessels was greater (41, 69, and 85%, resp.) than the increase in cardiac output (36, 51, and 42%, resp.). Local and total peripheral resistances reflected similar changes in that the local vascular resistance were decreased 51, 51 and 55%, whereas the total peripheral resistance was only decreased 43%. Although the major increase in flow was due to cardiac stimulation, there was a preferential reduction in the resistance of the splanchnic vascular bed. Serum potassium showed an initial sharp rise after glucagon injection that was followed by a sharp fall which correlated with the appearance of hyperglycemia.

3817 LACK OF CIRCULATORY CHANGES DUE TO MESENTERIC AND LIVER DENERVATION IN DOGS DURING REST AND EXERCISE. (E.) Ashkar, E. (Inst. Biol. Exp. Med., Buenos Aires, Argentina). *Acta Physiol. Lat. Am.* 20(4):308-315, 1970.

Sympathetic denervation of the liver and caudal mesenteric vascular beds was not followed by significant changes in the hemodynamic balance during the resting state of unanesthetized dogs. The average resting heart rate was 110 beats/min in controls and 115 after hepatomesenteric denervation; the average cardiac acceleration during exercise was 225 in normals and 214 after denervation. Resting aortic blood flow was similar in both experimental and control groups and it increased similarly following exercise in denervated and control animals. The calculated ratio between arterial blood flow and heart rate tended toward a slightly lower value after denervation. No significant difference was found between groups with respect to peripheral resistance. Since either adrenal medullectomy or hepatomesenteric denervation appear determining compensatory cardiovascular responses, which in turn determine little or no changes at the hemodynamic level, it might be suggested that both the distant effect of the adrenal medulla and the more localized action of the direct sympathetic nerve supply to the abdominal organs play a complementary action in circulatory homeostasis.

3818 INFLUENCE OF PERISTALTIC CONTRACTION OF THE STOMACH ON BLOOD FLOW THROUGH THE GASTROSPLENIC VEIN. (E.) Semba, T. (Hiroshima U. Sch. Med., Japan), K. Fujii and Y. Fujii. *Hiroshima J. Med. Sci.* 19(2-3):87-97, 1970.

Peristaltic contraction of the stomach produced apparent undulatory changes in the venous flow through the gastrosplenic vein. Three patterns emerged: the contraction phase type, where augmentation of flow occurred in the contraction period; the relaxation phase type in which the flow increased in the relaxation period; and the combination type in which augmentation of flow was produced twice, once in the contraction period and once in the relaxation period. The relaxation phase type was the occlusion type of blood flow. Augmentation of flow in the relaxation period may be induced by vasodilation produced by metabolic changes due to the prolonged obstruction of blood flow. The combination pattern was similar to that obtained in the colon by the stimulation of the pelvic nerve. A mechanism may exist which maintains a constant venous blood flow despite decreases in blood pressure.

3819 THE PARIETAL VASCULAR AREAS OF THE LIVER. (Rum.) Diaconescu, N. *Timisoara Med.* 15(2):185-189, 1970.

3820 ARTERIAL OPACIFICATIONS. D. ARTERIOGRAPHY OF THE BRANCHES OF THE ABDOMINAL AORTA SUPPLYING THE DIGESTIVE TRACT. (Fr.) Anonymous. *Concours Med.* 93(6):103-121, 1971.

3821 PHARMACO-ANGIOGRAPHY OF THE CELIAC ARTERIAL SYSTEM. (Jap.) Mitani, I. (Kanazawa U. Sch. Med., Japan). *J. Radiol. Phys. Ther. Univ. Kanazawa* 85:45-84, 1970.

3822 VARIATIONS OF THE ARTERIAL SYSTEM IN THE REGION OF THE CECUM AND VERMIFORM APPENDIX. (Pol.) Jagodzińska, K. (Med. Acad. Inst. Reg. Anat., Kaowice, Poland), A. Kohmann and S. Kohmann. *Folia Morphol. (Warsz.)* 30(2):219-222, 1971.

3823 LIVER BLOOD FLOW MEASUREMENTS USING RADIOACTIVE COLLOIDS. (E.) Tothill, P. (Roy. Infirm., Edinburgh, Scotland), G. P. McLoughlin and A. I. S. MacPherson. *Br. J. Radiol.* 44(521):403, 1971.

3824 INTRAMURAL LYMPH VESSELS AND STRUCTURE OF HEPATIC VEINS IN MAN. (Rus.) Bocharov, V. I. (Sechenov 1st Med. Inst., Moscow). *Arkh. Anat. Gistol. Embriol.* 59(12):29-36, 1970.

See also number: 4388

3825 A PAEDIATRIC TUBE AND CAPSULE FOR SUCTION BIOPSY OF THE SMALL INTESTINAL MUCOSA DESIGNED FOR DIRECT NASOGASTRIC INTUBATION. (E.) Schneider, R. E. (U. San Carlos Roosevelt Hosp., Guatemala) and R. Chang. *Gut* 12(5): 399-402, 1971.

A pediatric tube and capsule for suction biopsy of the small intestinal mucosa designed for direct nasogastric intubation was modified (smaller diameter) to eliminate local nasal trauma and damage to the tube by children's teeth during transoral intubation. This technique was used to obtain suction biopsies from the proximal mucosa of the small intestine in protein-calorie malnourished children. The failure rate with the modified tube and capsule was 21%, significantly lower than the 39% failure rate experienced with the original multipurpose suction biopsy tube. The application of a local anesthetic to the nasal mucosa made it possible to administer smaller doses of the drugs used for sedation; consequently, emotional trauma was decreased.

3826 RECIPROCAL RELATION BETWEEN PLASMA ALBUMIN LEVEL AND HEPATIC SULFOBROMOPHTHALEIN REMOVAL. (E.) Grausz, H. and R. Schmid (U. California Dept. Med., San Francisco). *N. Engl. J. Med.* 284(25):1403-1406, 1971.

Before albumin infusion, BSP removal in 4 patients with hypoalbuminemia due to nephrotic syndrome was unusually rapid, with retention of less than 1% of dye at 45 min. An i.v. infusion of concentrated salt-poor albumin, which led to an acute increase in the plasma albumin concentration, also was associated with a marked reduction in the rate of BSP removal resulting in a dye retention of 4-9% at 45 min. In the presence of hypoalbuminemia, a normal or only slightly impaired BSP test may conceal a more advanced degree of hepatocellular dysfunction. In such false-negative patients, the presence of hypoalbuminemia seems to provide a logical explanation for the unexpectedly rapid disappearance rate of BSP.

3827 THE ULTRASONIC SCAN IN THE MANAGEMENT OF AMEBIC HEPATIC ABSCESS. (E.) Monroe, L. S. (Scripps Clin. Res. Found., La Jolla, Calif.), G. R. Leopold, J. W. Bronw and J. L. Smith. *Am. J. Dig. Dis.* 16(6):523-528, 1971.

Seven cases of amebic hepatic abscess are presented in which ultrasonic scan was used in addition to rectilinear scan, the scintillation camera and serologic studies. In all cases except one in which Chloroquine and Emetine therapy was administered between tests, the lesions were visualized equally well with the scintillation camera and with the ultrasonic scan. In 5 of 7 cases, however, the ultrasonic scan provided additional information, in that the fluid-containing nature of the lesion could be ascertained. In 5 of 7 cases, multiple examinations by both sonar and scintillation technics were carried out during the course of treatment, and were equally effective in demonstrating the progress towards resolution. The use of the ultrasonic scan without ionizing radiation allows for its use at frequent intervals to evaluate the course of resolution.

3828 A NEW METHOD FOR MEASURING THE ACIDITY OF GASTRIC JUICE. (E.) Kageyama, T. (Osaka Med. Coll., Japan), T. Kurisu, E. Kou, I. Watanabe, N. Yamaguchi and K. Masumoto. *Bull. Osaka Med. Sch.* 16(2):109-114, 1970.

When the specific electrical conductivity of gastric juice, as measured by a gastric acid meter MST-Type 1, was less than 11 millimho/cm, the free acid was below 10 mEq/liter. Thus the presence of hypoacidity or an acidity could be demonstrated. Whenever the specific electrical conductivity exceeded 11 milliho/cm, the highly significant relationship was represented by r = +0.965. The total acidity of gastric juice was under 30 mEq/liter when the specific electrical conductivity of the gastric juice was under 11 milliho/cm. With characteristic terminals, the gastric acid meter MST-type 1 was capable of showing the specific electrical conductivity of HCl in gastric juice directly on the meter. Results of gastric acid measured by this new technique and those measured by the usual quantitative chemical methods were similar.

3829 AN IMPROVED TECHNIC FOR THE COLLECTION OF BILE IN THE UNANESTHETIZED RAT. (E.) Knapp, W. C. (William S. Merrell Co., Cincinnati, Ohio), G. A. Leeson and G. J. Wright. *Lab. Anim. Sci.* 21(3):403-405, 1971.

A jacket of about 1 cm in length was fashioned for the PE 50 cannula from a piece of PE 250 tubing which was cut to fit properly. This jacket was permanently attached with epoxy glue. The method resulted in fastening the cannula securely to both the mesentery and the ventral musculature, as well as ligating it into the bile duct, making it virtually impossible for the unanesthetized rat to dislodge the cannula. The procedure was used successfully for extended periods of time while maintaining normal biliary flow rate (1 ml/hr), and the cannula has yet to be inadvertently removed. The weight of a dead 600 g rat was easily supported by one of these cannulae.

3830 THE MEASUREMENT OF NON-ESTERIFIED FATTY ACIDS IN ICTERIC BODY FLUIDS.

(E.) Lappin, T. R. J. (Roy. Victoria Hosp., Belfast, Ireland). *Clin. Chim. Acta* 33(1): 153-160, 1971.

In order to investigate further the interference caused by bilirubin in nonesterified fatty acid determinations, standard chloroform solutions were prepared in the range 2-16 mg bilirubin/liter. Indirect bilirubin, a diacid, apparently forms a chloroform-soluble copper salt which reacts with the diethyldithiocarbamate (DEDTC) reagent to cause an apparent elevation of nonesterified fatty acid levels. The modified method should be used when indirect bilirubin concentration exceeds about 0.5 mg%. Nonesterified fatty acids were higher in the amniotic fluid of Rh-incompatibles than in Rh-compatibles. The maternal serum amniotic fluid ratio for nonesterified fatty acids in the complete series was 23.7:1. The same constituents of serum were removed by hexane as by chloroform at pH 6.2. Although the maternal serum amniotic fluid ratio for nonesterified fatty acids is large (24:1), amniotic fluid nonesterified fatty acids may be an important source of energy for the fetus.

3831 APPLICATION OF THE LEUCOCYTE MIGRATION TEST TO THE DIAGNOSIS OF REJECTION AFTER LIVER TRANSPLANTATION. (E.) Eddleston, A. L. W. F., M. G. M. Smith, C. G. Mitchell and R. Williams (Kings Coll. Hosp., London). *Transplantation* 12(1):11-17, 1971.

The leukocyte migration test detected changes in cell-mediated hypersensitivity to liver and histocompatibility antigens during rejection after liver transplantation. During the early weeks after transplantation there was a good correlation between changes in migration index and the development of acute rejection (5 of 10 cases), as evidenced by liver biopsy showing a portal tract infiltrate of lymphocytes, plasma cells and immunoblasts, together with necrosis of surrounding hepatocytes. Inhibition of migration was found early in the rejection episodes, usually coincident with a rise in serum enzymes. Inhibition of leukocyte migration was not found in 2 cases who developed a cholestatic jaundice, probably not attributable to rejection. As chronic rejection was associated with inhibition of migration in only one of two patients, the leukocyte migration test is of most value in the diagnosis of acute rejection.

3832 PHARMACOLOGICAL EMPTYING OF THE STOMACH WITH METOCLOPRAMIDE. (E.) Howells, T. H. (Roy. Free Hosp., London), T. Khanam, L. Kreel, C. Seymour, B. Oliver and J. A. H. Davies. *Br. Med. J.* 2(5761):558-560, 1971.

Metoclopramide given by mouth emptied moderate water residues in stomachs to a degree found in fasting subjects premedicated with diazepam. The drug may be administered i.v. or i.m. as well as taken by mouth. Using the i.v. route, it decreased the emptying time of solid meals into the duodenum. Barium swallow radiography is a reliable method of assessment of stomach content. When stomach residues are present 20 mg of metoclopramide is given i.v. which effects emptying of the stomach contents into the duodenum in 30 min when the ingested meal is light (coffee and biscuits), and 75 min when heavier meals (bacon, sandwich, 2 rolls) are taken. The place of metoclopramide in the preanesthetic management of obstetric patients needs urgent investigation to confirm hopes of reducing regurgitation and vomit hazard which continues to be a significant cause of death.

3833 COMPUTER ASSISTED EVALUATION OF LIVER SCANS. (E.) Chackett, K. F. (Dudley Road Hosp., Birmingham, England) and J. B. Welborn. *Phys. Med. Biol.* 16(3):533-535, 1971.

Computing facilities may be applied to the problem of scan evaluation in terms of diagnosis. A computer program called PREDICT was devised which reads in liver scan data (14 parameters) for any scan and prints out a statement of the most probable diagnosis and an estimate of its reliability. With PREDICT, predicted diagnoses were correct in 200 (70%) of 284 cases, and equivocal in 18 (7%). In 44% of cases clinical assessment was correct and agreed with the computer diagnosis. In 11% of cases they produced a correct diagnosis where PREDICT failed to do so; in 27% of cases the computer diagnosis succeeded where subjective clinical evaluation failed. Apparently the acumen of the experienced physician, who can appreciate variations in the scan pattern too subtle for the present coding procedure, is more than matched by the superior powers of memory and correlation of the computer.

3834 THE ACCURACY OF BARIUM ENEMA EXAMINATION: AN APPRAISAL OF TWO TECHNIQUES. (E.) Pacsoo, C. (Southern Gen. Hosp., Glasgow, Scotland) and W. B. James. *Scott. Med. J.* 16(6): 293-296, 1971.

The double contrast horizontal tube method was compared with a low density barium/high kilovoltage conventional technique using undercouch tube exposures. A higher incidence of carcinoma was found with the conventional method, which may be due to selection of aged patients for this method. The higher incidence of polyps diagnosed by the double contrast method could be due to selection of patients with rectal bleeding. Three proven polyps were missed by the conventional method, 2 were in the sigmoid and one in the ascending colon. The 2 rectal polyps missed by double contrast were both small in size. Though the 2 groups were not strictly comparable, the double contrast method is probably more accurate in diagnosing both pathology and normality.

3835 THE VALUE OF THE PLAIN FILM ROENTGENOGRAM IN PYLORIC STENOSIS. (E.) Riggs, W., Jr. (U. Tennessee Coll. Med., Memphis) and L. Long. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):77-82, 1971.

Plain supine abdominal roentgenograms of 200 vomiting infants, 100 of whom had pyloric stenosis, were analyzed. Inferior gastric air outline below L 2 was the most valuable finding since it reflected gastric distention as well as decreased gas in the remaining bowel, thereby allowing the stomach to descend into the scaphoid lower abdomen. A maximum gastric air dimension greater than 7 cm and obvious gastric peristalsis were also seen predominantly, if not solely, in infants with pyloric stenosis. Marked overall gastric air distention, mottled appearance of gastric contents and sparcity of gas in the small intestine and colon were also observed. Approximately 25% of the pyloric stenosis cases had enough corroborative evidence on their plain film roentgenograms to eliminate the need for further radiologic exposure.

3836 ANASTOMOTIC, GASTROJEJUNAL ULCER: ACCURACY OF RADIOLOGICAL DIAGNOSIS IN SURGICALLY PROVEN CASES. (E.) Schulman, A. (Gen. Infirm., Leeds, England). *Br. J. Radiol.* 44(522): 422-433, 1971.

There were 26 cases of gastrojejunal ulcer (44%) with a positive barium meal report and 13 with a suggestive report for a total of 39 positives plus suggestives (66%). Of 29 cases of gastrojejunal ulcer following gastroenterostomy and of the 20 following partial gastrectomy there were 37.9 and 50.0% respectively with a positive barium meal report. In at least 23 of the 26 positive reports, positivity was based on the finding of an ulcer niche. Various ancillary signs were suggestive, especially those resulting from stenosis near the anastomosis. As evidence that ulceration was actually present in all the present cases during their barium meal examinations, their clinical features and time intervals before surgical proof were presented.

3837 DETERMINATION OF BILIRUBIN IN LIVER HOMOGENATES AND SERUM WITH DIAZOTIZED p-IODOANILINE. (E.) Van Roy, F. P. (St. Rafael Acad. Clin., Louvain, Belgium), J. A. T. P. Meuwissen, F. De Meuter and K. P. M. Heirwegh. *Clin. Chim. Acta* 31(1):109-118, 1971.

3838 USE OF GASTRIC FUNCTION TESTS BY BRITISH GASTROENTEROLOGISTS. (E.) Baron, J. H. (Hammersmith Hosp., London) and J. A. Williams. *Br. Med. J.* 1(5742):196-199, 1971.

3839 TECHNIC OF SPLENOPORTOGRAPHY. (Rus.) Berzin, S. A. *Vestn. Khir.* 105(11): 144-145, 1970.

3840 EXPERIMENTAL COMPARISON OF THE DETECTABILITY OF LIVER TUMOR BETWEEN SCINTILLATION CAMERA AND CONVENTIONAL RECTILINEAR SCANNERS. (Jap.) Watanabe, K. (Kyushu U. Sch. Med., Japan) and M. Inakura. *Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.)* 30(7):629-641, 1970.

3841 METHOD FOR VISUALIZING THE NEGATIVE GALLBLADDER. (Sp.) Sordelli Dauffenback, J. C. (Pte. Roca 416, Rosario, Argentina). *Medicina (Mex.)* 50(1094):559-561, 1970.

3842 THE CONTRIBUTION OF SCINTISCANNING TO PULMONARY AND GASTROINTESTINAL SURGERY. (Fr.) Decostre, P. (Free U. Brussels Sch. Med., Belgium) and A. M. Ermans. *Brux. Med.* 51(1): 11-16, 1971.

3843 SOME ASPECTS OF STUDIES RELATING TO PANCREAS SCANNING. (E.) Cottrall, M. F. (Roy. Marsden Hosp., Sutton, England), V. R. McCready, R. P. Parker and D. M. Taylor. *Br. J. Radiol.* 44(521):402-403, 1971.

3844 LIVER AND SPLEEN SCANNING: SOME PHYSICAL AND CLINICAL ASPECTS. (E.) Wood, E. J. (Roy. Free Hosp., London) and A. S. Tavill. *Br. J. Radiol.* 44(521):402, 1971.

3845 SUBTRACTION SCANNING TECHNIQUES IN LIVER AND PANCREAS INVESTIGATIONS. (E.) Gregg, D. (Addenbrooke's Hosp., Cambridge, England) and K. F. Szaz. *Br. J. Radiol.* 44(521): 402, 1971.

3846 THE BARIUM ENEMA: TECHNIQUE, VALUE, AND LIMITATIONS. (E.) Martel, W. (Univ. Hosp., Ann Arbor, Mich.) and J. M. Robins. *Cancer* 28(1):137-143, 1971.

3847 OCCULT BLOOD TESTING FOR DETECTION OF ASYMPTOMATIC COLON CANCER. (E.) Greegor, D. H. *Cancer* 28(1):131-134, 1971.

3848 USE OF ISOTOPES IN DETERMINING OCCULT BLOOD. (E.) Fall, D. J. (U. Michigan Med. Ctr., Ann Arbor), D. H. Kuiper and H. M. Pollard. *Cancer* 28(1):135-136, 1971.

3849 SPLENIC PUNCTURE IN DIAGNOSIS OF UPPER GASTROINTESTINAL HEMORRHAGE. (Sp.) López Gibert, J. *Rev. Esp. Enferm. Apar. Dig.* 34(4):433-434, 1971.

3850 DUODENAL EXFOLIATIVE CYTOLOGY. DIAGNOSIS OF CANCER OF DUODENUM, PANCREAS, AND

BILIARY TRACT BY EXFOLIATIVE CYTOLOGY. (E.) Olsen, J. H. (Natl. Hosp., Copenhagen, Denmark). *Scand. J. Gastroenterol.* 6(Suppl. 9):105-109, 1971.

3851 HEPATIC CLEARANCE TESTS. (Sp.) Meeroff, J. C. *Rev. Esp. Enferm. Apar. Dig.* 34(4):375-394, 1971.

3852 PYLOROBULBOSCOPY WITH AXIAL VIEW FIBROSCOPES. RESULTS IN 142 EXAMINATIONS. (Fr.) Housset, P. (Bichat Hosp., Paris), A. Commandi, J. Toulet and C. Debray. *Arch. Fr. Mal. App. Dig.* 60(4-5):253-260, 1971.

3853 IOGLYCAMIDE (BILIVISTAN) AS A CONTRAST MEDIUM FOR INTRAVENOUS CHOLEGRAPHY. A CLINICAL AND EXPERIMENTAL INVESTIGATION. (E.) Brismar, J. (Karolinska Inst., Stockholm, Sweden), P. Lindgren and G. F. Saltzman. *Acta Radiol.* [*Diagn.*] 11(2):129-147, 1971.

3854 INCREASED BILIARY CONCENTRATION OF CONTRAST MEDIA BY COMBINED ORAL AND INTRAVENOUS ADMINISTRATION. (E.) Haverling, M. (Karolinska Hosp., Stockholm), J. Swedenborg and L. Thulin. *Acta Radiol.* [*Diagn.*] 11(2):122-128, 1971.

3855 ANTICHOLINERGIC AIDED STUDY OF THE GASTROINTESTINAL TRACT. (E.) Ferrucci, J. T., Jr. (Massachusetts Gen. Hosp., Boston) and K. T. Benedict, Jr. *Radiol. Clin. North Am.* 9(1):23-39, 1971.

3856 AUGMENTED HISTAMINE TEST. (Nor.) Odberg, T. (County Hosp., Molde, Norway) and S. Skandsen. *Tidsskr. Nor. Laegeforen.* 90(24):2254-2257, 1970.

3857 DIAGNOSTIC RELIABILITY OF NEEDLE BIOPSY OF THE LIVER IN CIRRHOSIS. (Ger.) Lindenfelser, R. (Rhein. Westphal. Tech. Sch., Aachen, Germany) and H. Breining. *Med. Klin.* 65(46):2021-2025, 1970.

3858 INFUSION CHOLANGIOGRAPHY. (Pol.) Zgliczynski, S. L. (Med. Acad. Inst. Roentgenol., Warsaw, Poland) and L. Lazecki. *Pol. Przegl. Radiol.* 35(1):57-61, 1971.

3859 INTERPRETATION OF THE RESULTS OF LIVER SCANNING WITH ^{99m}Tc SULFUR COLLOID. (Ger.) Zita, G. (Kaiserin Elisabeth Hosp., Vienna, Austria), H. Rieder and C. Muller. *Munch. Med. Wochenschr.* 113(15):581-582, 1971.

3860 VENTRICULOSCANNOGRAPHY IN THE DIAGNOSIS OF CANCER OF THE STOMACH. (Rus.) Baramidze, T. G. *Med. Radiol. (Mosk.)* 16(2):24-27, 1971.

3861 USE OF A BICYCLE SADDLE FOR EXAMINATION IN THE STANDING POSITION IN ABDOMINAL EMERGENCIES. (Fr.) Viallet, P. (CHU Serv. Radiol., Clermont Ferrand, France), R. Dumazer, J. F. Viallet and A. M. Georget. *J. Radiol. Electrol. Med. Nucl.* 52(1-2):46, 1971.

3862 REDUCTION OF PHYSIOLOGIC DEGRADATION IN IMAGING THE LIVER. (E.) Smoak, W. M. (Mount Sinai Hosp., Miami Beach, Fla.), M. Smith and P. J. Kenny. *J. Nucl. Med.* 12(3):119-122, 1971.

3863 BARIUM LAVAGE. (Fr.) Louant, P. H. (41 Rue De La Baille, Lens, Belgium). *J. Belge Radiol.* 54(1):17-19, 1971.

3864 THE POSITION OF THE PATIENT AND THE INCIDENCE OF THE RAYS AS FUNDAMENTAL FACTORS DETERMINING THE RADIOLOGICAL MORPHOLOGY OF THE STOMACH. (Sp.) Cros Campillo, T. (Francisco Franco City Sanitar., Madrid). *Hosp. Gen. (Madr.)* 10(6):621-651, 1970.

3865 SUGGESTING AND JUSTIFYING A NEW INDICATION FOR GASTROTOMY WITH BIOPSY. (Rum.) Pop, I. (2nd Surg. Clin., Tirgu Mures, Rumania), D. Popa, C. Pana and T. Georgescu. *Rev. Med. (Tirgu Mures)* 16(2):132-135, 1970.

3866 GASTROENTEROLOGIC DIAGNOSIS. ITS POSSIBILITIES AND ITS LIMITS. (Ger.) Freye, K. (Uhlandstr. 121, Berlin). *Z. Aerztl. Fortbild. (Jena)* 60(1):1-9, 1971.

See also numbers: 3671, 4345, 4500

ESOPHAGUS

3867 SPLENIC VEIN THROMBOSIS AND BLEEDING ESOPHAGEAL VARICES. (E.) Yale, C. E. (U. Wisconsin Med. Sch., Madison) and A. B. Crummy. *JAMA* 217(3):317-320, 1971.

Splenic vein thrombosis and bleeding esophageal varices were secondary to pancreatitis in 5 patients, peritoneal infiltration by Hodgkin's disease in one and shunt surgery in one. Four patients treated with splenectomy were alive and without recurrent bleeding from 8 to 60 months after the operation. Splenectomy is a surgical treatment for segmental portal hypertension secondary to splenic vein obstruction, while a shunt is a surgical treatment of generalized portal hypertension. Since angiography is the best method of differentiating segmental portal hypertension from generalized portal hypertension, all patients with bleeding gastroesophageal varices should have angiography prior to surgery. Either splenoportography or transarterial portography via the celiac axis and superior mesenteric artery may be utilized to evaluate the portal system.

3868 ESOPHAGEAL CANCER IN A MIDWESTERN COMMUNITY. (E.) Lynch, H. T. (657 N. 27th St., Omaha, Neb.), D. D. Ewers, A. J. Krush, E. A. Sharp and M. J. Swartz. *Am. J. Gastroenterol.* 55(5):437-442, 1971.

In a midwestern community (Omaha-Douglas County, Nebraska), the incidence rate for esophageal cancer in 1964 was 4.6 per 100,000 population. The United States mortality for esophageal cancer (1957) was 2.7 per 100,000 population. The incidence rate in the community exceeded that of the United States mortality. Most of the patients were alcoholics and a fair percentage worked in the packing house industry. The patients were, for the most part, from a lower socioeconomic level and the greater percentage were Negro. No familial occurrence of esophageal cancer was found. Characterizations of high risk cancer groups could be useful in cancer control through directing diagnostic screening methods at the populations described.

3869 SURGICAL THERAPY OF REFLUX ESOPHAGITIS. (E.) Rossetti, M. (U. Basel Dept. Surg., Switzerland), K. Hell and M. Allgower. *Chir. Gastroenterol.* 5(1):5-21, 1971.

Abdominal fundoplication was the method of choice in treating reflux esophagitis in cases of sliding hiatus hernia or cardiofundal malposition and cardiac insufficiency. The principle of this operation, which consists of invaginating the terminal segment of the esophagus into the fundus of the stomach, is to correct the cardiac mechanism. Vagotomy and pyloroplasty should be combined with fundoplication in cases with predominance of peptic components or associated ulcers. Transthoracic truncal vagotomy and abdominal pyloroplasty were preferred procedures in organic stages of the reflux disease with brachyesophagus, stenosis, ulcers, hemorrhage and malignancy. Gastric acid suppression aided healing even in advanced lesions of esophagitis. Paraesophageal hiatus hernia with intrathoracic gastric volvulus can be treated successfully by abdominal gastroplexy.

3870 DIFFUSE PULMONARY FIBROSIS AND HIATUS HERNIA. (E.) Pearson, J. E. G. (U. Bristol Hosps., England) and R. S. E. Wilson. *Thorax* 26(3):300-305, 1971.

Six patients presenting with initially obscure pulmonary fibrosis are described. The lesion was a chronic diffuse, sometimes patchy, fibrosis. Hiatus hernia with gastroesophageal reflux was demonstrated in all 6 patients by barium meal and esophagoscopy. Aspiration of gastric juice has been shown to cause an acute lung lesion with hemorrhagic exudate and eventual fibrosis. Repeated small aspirations of refluxed gastric juice associated with hiatus hernia may lead to a widespread fibrosis. All patients with chronic diffuse pulmonary fibrosis of doubtful origin should have a barium meal examination to exclude the presence of a hiatus hernia, even in the absence of a suggestive history, as many patients with gastroesophageal reflux are symptomless. In the more advanced cases the morbidity and mortality would seem considerable, half of the present patients dying within 2 years of diagnosis.

3871 SUITABILITY OF SKIN FOR ESOPHAGEAL RECONSTRUCTION. (Pol.) Jezioro, Z. (Med. Acad. 3rd Surg. Clin., Wroclaw, Poland), M. Bernat and T. Wyrwalski. *Pol. Przegl. Chir.* 43(1):83-91, 1971.

3872 SO-CALLED SPONTANEOUS RUPTURES OF THE ESOPHAGUS. (It.) Sette, P. (U. Inst. Gen. Clin. Ther. Surg., Bologna, Italy). *Acta Chir. Ital.* 26(3):203-242, 1970.

3873 GASTRIC RESECTION IN PATIENTS WITH ARTIFICIAL ESOPHAGUS MADE FROM THE SMALL INTESTINE. (Rus.) Vinogradova, O. I. and A. I. Sveshnikov. *Sov. Med.* 34(1):72-76, 1971.

3874 THE ESOPHAGOGASTRIC ULCER OF THE PIG. A PATHOGENIC HYPOTHESIS. (Fr.) Tournut, J. (Natl. Vet. Sch., Toulouse, France) and C. Labie. *Rev. Med. Vet.* 33(12):1105-1113, 1970.

3875 PRIMARY ADENOCARCINOMA OF THE ESOPHAGUS ARISING FROM HETEROTOPIC GASTRIC GLANDS. (Jap.) Sakamoto, G. (Tokyo Toranomon Hosp.), K. Nakamura and K. Saito. *Gan no Rinsho (Jap. J. Cancer Clin.)* 16(11):1105-1110, 1970.

3876 SUCCESSFUL TREATMENT OF A PATIENT WITH ESOPHAGEAL ATRESIA. (Bul.) Kolev, N. and A. Atanasov. *Khirurgiia (Sofiia)* 23(5): 480-482, 1970.

3877 ARTIFICIAL ESOPHAGUS OBSTRUCTION BY AN EXCESS SEGMENT OF TRANSPLANTED LARGE INTESTINE. (Pol.) Jezioro, Z. (Med. Acad 3rd. Surg. Clin., Wroclaw, Poland) and M. Bernat. *Pol. Przegl. Chir.* 42(11):1690-1694, 1970.

3878 EARLY ETIOLOGIC DIAGNOSIS OF DIGESTIVE HEMORRHAGE. EMERGENCY ESOPHAGOSCOPY AND GASTROSCOPY. (Fr.) Miniconi, P. (St. Jacques Hosp., Nantes, France), D. Perrin and G. Delumeau. *Presse Med.* 78(46):2011-2013, 1970.

3879 CHANGES IN HEMOCOAGULATION IN PATIENTS WITH CHEMICAL BURNS OF THE GASTRO-INTESTINAL TRACT. (Rus.) Chernenko, V. F. and A. P. Perfiljev. *Vestn. Khir.* 105(11):25-27, 1970.

3880 TRANSABDOMINAL LIGATURE RESECTION OF THE ESOPHAGUS IN CASES OF BLEEDING VARICES. (Ger.) Boerema, I. (Univ. Surg Clin., Amsterdam, Netherlands), P. J. Klopper and A. A. Holscher. *Chirurg* 41(10):472-475, 1970.

3881 RUPTURE OF THE ESOPHAGEAL MUCOSA. (Por.) Da Silveira, I. C. *Brasil. Med.* 84(4): 183-184, 1970.

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3887 DYSPHAGIA DUE TO LEUKEMIC INVOLVEMENT OF THE ESOPHAGUS. (E.) Al Rashid, R. A. (U. Nebraska Med. Ctr., Omaha) and R. K. Harned. *Am. J. Dis. Child.* 121(1):75-76, 1971.

3888 SEGMENTAL REPLACEMENT OF THE THORACIC ESOPHAGUS WITH A SILASTIC PROSTHESIS. (E.) Watanabe, K. (Univ. Sch. Med., Stanford, Calif.) and J. B. D. Mark. *Am. J. Surg.* 121(3): 238-240, 1971.

3889 WAR INJURIES TO THE CERVICAL DIGESTIVE TRACT. TWENTY-TWO CASES. (Fr.) Gouzy, J. (16 Bd. de L, Ayrolle, Millau, France), J. J. Stipon and G. Voilque. *J. Fr. Otorhinolaryngol.* 20(1):37-47, 1971.

3890 SPONTANEOUS HEMATOMA OF THE ESOPHAGUS. A COMPLICATION OF UREMIA. (E.) Chen, P. (Harvard Med. Sch., Boston, Mass.), R. Lebowitz and A. M. Lewicki. *Radiology* 100(2):281-282, 1971.

3891 ESOPHAGEAL DETERIORATION IN SCLERODERMA. (E.) Garrett, J. M. (U. Minnesota Mayo Grad. Sch. Med., Rochester), R. K. Winkelmann, J. F. Schlegel and C. F. Code. *Mayo Clin. Proc.* 46(2):92-96, 1971.

3892 RADIOGRAPHY OF ESOPHAGOPLASTY. (Hun.) Kopp, M. (Szeged Med. U., Hungary). *Magy. Radiol.* 23(1):48-55, 1971.

3893 SAPHENO-UMBILICAL ANASTOMOSIS IN HEMORRHAGE DUE TO RUPTURED ESOPHAGEAL VARICES. (Fr.) Moulle, P. *Presse Med.* 79(7): 289, 1971.

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Hoffmann, E. (U. Dusseldorf Surg. Clin., Germany), A. Junemann, F. Niemann and R. Schroder. *Zentralbl. Chir.* 96(3):70-91, 1971.

3896 COMPLICATIONS AFTER STARCK'S DILATATION OF THE ESOPHAGUS. (Ger.) Wenzel, K. P. (Univ. Surg. Clin., Halle/Saale, Germany). *Monatsschr. Ohrenheilkd.* 104(12):563-568, 1970.

3897 EMERGENCY LIGATION OF BLEEDING ESOPHAGEAL VARICES. (Por.) Vieira, O. M. (U. Rio de Janeiro Sch. Med., Brazil) and D. E. F. Triani. *Rev. Med. Estado Guanabara* 37(2):213-218, 1970.

3898 HIATAL HERNIA. CONSIDERATIONS ON THE SURGICAL TREATMENT. (Sp.) Pataro, V. F. (Avellaneda Polyclin., Buenos Aires, Argentina), E. A. Orlando and E. F. Pataro. *Medicina (Mex.)* 50(1090):423-428, 1970.

3899 COMPARISON OF GASTRIC TOXICITY OF ACETYLSALICYLIC ACID WITH ROUTE OF ADMINISTRATION IN THE RAT. (E.) Pfeiffer, C. J. (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia) and L. G. Lewandowski. *Arch. Int. Pharmacodyn. Ther.* 190(1):5-13, 1971.

Salicylate was injected at doses of 31.5, 62.5 or 125 mg/kg into pylorus-ligated rats 4 hr postoperatively. Gastric lesions (ulcer) were most severe when produced by os administration of acetylsalicylic acid, although they also occurred following s.c. injection. Estimates of the areas of plasma, salicylate concentration-time curves for a single dose of aspirin administered by the different routes of administration indicated that the greatest area was apparent after oral administration; however, high plasma levels of salicylate were not necessarily causally related to induction of gastric lesions. Changes in gastric secretion were slight or nonexistent in rats treated by p.o., s.c. or i.r. aspirin, but volume and concentration were decreased in rats treated i.p. salicylate. The direct effect of acetylsalicylic acid on the mucosal surface apparently contributes significantly to the pathogenesis of gastric lesions when the acid is present.

3900 AUTOVAGOTOMY AND GASTRIC BEZOAR. A CASE REPORT. (E.) Kirks, D. R. (U. California Dept. Radiol., San Francisco) and G. C. Szemes. *Gastroenterology* 61(1):96-98, 1971.

A 63-yr-old man was admitted with constipation, abdominal fullness, fatigability, and a 35 lb weight loss. The reaction of a guaiac test of the stool was positive. Upper gastrointestinal examination revealed an ulcerating mass of the distal esophagus which extended into the stomach. A large gastric bezoar was also noted without any associated abnormality of the pylorus or duodenum. At necropsy, the tumor was seen to extend through the wall of the lower esophagus and grossly involved both anterior and posterior vagal trunks. Moderately well differentiated squamous cell carcinoma with extensive perineural lymphatic involvement was noted. This case emphasizes the milieu-poor gastric emptying and decreased acid secretion for formation of gastric bezoar. A gastric outlet that is adequate roentgenographically may be associated with severe retention and subsequent bezoar formation after surgical or pathological interruption of the vagus nerve.

3901 HYPERTROPHIC PYLORIC STENOSIS IN OLDER INFANTS. (E.) Konvolinka, C. W. (Geisinger Med. Ctr., Danville, Pa.) and C. R. Wermuth. *Am. J. Dis. Child.* 122(1):76-78, 1971.

A 4½ month old infant was admitted because of fever and lethargy following which he began to vomit. Serum electrolyte determinations revealed a mild hypochloremic, hypokalemic alkalosis. The persistence of this alkalosis indicated a diagnosis of hypertrophic pyloric stenosis. The diagnosis was confirmed by X-ray films and the stenosis was corrected successfully by pyloromyotomy. Mucosal edema secondary to mechanical irritation or inflammation may play a prominent role in the pathogenesis of hypertrophic pyloric stenosis. Although pyloric stenosis is rarely seen after 3 months of age, one cannot exclude the diagnosis on the basis of age alone.

3902 HYDROGEN PERMEABILITY OF CANINE GASTRIC SECRETORY EPITHELIUM DURING FORMATION OF ACUTE SUPERFICIAL EROSIONS. (E.) Moody, F. G. (U. Alabama Sch. Med., Birmingham) and J. S. Aldrete. *Surgery* 70(1):154-160, 1971.

Hemorrhagic shock in mongreal dogs produced a small nonsignificant decrease in hydrogen back diffusion, accompanied by a comparable, significant decrease in sodium output. Endotoxemia (E. coli endotoxin) provided a significant intraluminal gain of sodium, potassium, and water with only a small increase in rate of hydrogen loss from the chamber. Aspirin, as expected, induced a large transmucosal exchange of sodium for hydrogen, and an intraluminal gain of water and potassium. Total perfusion of the gastric segment was reduced during hemorrhagic shock and endotoxemia but slightly increased during aspirin injury. The rate of accumulation of aminopyrine in acid instillates was comparable to the total perfusion of the gastric segment during the 3 procedures. Small, linear, well demarcated areas of epithelial disruption (stress ulcers) appeared on the surface of some rugi during hypotension and were few in number. Lesions were slower to develop during endotoxin administration and also were few in number. Aspirin erosions were smaller in size, but greater in number. Antacid therapy instituted during periods of hypotension and hypoperfusion might prevent mucosal damage and thereby obviate the clinical consequence of massive gastrointestinal hemorrhage.

3903 GASTRECTOMY, ACHLORHYDRIA AND CHOLERA. (E.) Gitelson, S. (Hebrew U.-Hadassah Med. Sch., Jerusalem, Israel). *Isr. J. Med. Sci.* 7(5):663-667, 1971.

Five of 25 patients with cholera of varying degrees of severity, had undergone subtotal gastrectomy or vagotomy and pyloroplasty previously. The above supports the belief that gastric hypoacidity or anacidity predispose to infection with cholera. Sixteen of 21 patients revealed an absence of free acid in their fasting gastric juice (pH mean: 6.4). Following the administration of a test meal to 10 patients, there was an interval during which no free acid was present in the gastric content. A lack of free acid was found not only in patients with a severe clinical picture but also in patients with mild symptoms and with no dehydration or electrolyte loss. Hence the hypo- or achlochydria was not simply a result of electrolyte imbalance and fluid loss due to the cholera infection. After addition of diluted hydrochloric acid, lemon juice or grapefruit juice, the pH of food mixtures fell to levels close to or below 4.0 which are regarded as vibriocidal.

3904 SEPARATION, IDENTIFICATION AND ASSAY OF SERUM PROTEINS IN THE GASTRIC JUICE. (E.) Runcan, V. (Grivita Med. Clin., Bucharest, Rumania), A. Vântu, S. Tacorian, N. Stafidov and I. State. *Rev. Roum. Med. Interne* 8(2):81-86, 1971.

In the complex composition of the gastric juice from patients with atrophic gastritis, the mucopolysaccharides secreted by the gastric mucosa were mixed with a variable quantity of serum proteins (albumin and gamma-globulins). The value of the gamma globulins/albumin ratio in the gastric juice was above unity. These 2 protein fractions were not accompanied by serum globulin fractions with smaller molecular weight i.e. $alpha_1$, $alpha_2$ or beta globulins. Albumin might be secreted by the gastric mucosa since it was not accompanied by the light globulin fractions and most of the gamma-globulins were IgA, the most frequent immunoglobulins in the digestive tract. Since the presence of albumin can be interpreted as the effect of a mucosal lesion, apparently it has no metabolic role in the digestive tract.

3905 GASTRIC POLYPS. HISTOLOGIC TYPES AND THEIR RELATIONSHIP TO GASTRIC CARCINOMA. (E.) Tomasulo, J. (U. Pennsylvania Hosp., Philadelphia). *Cancer* 27(6):1415-1418, 1971.

Of a total of 97 gastric polyps, 35% were found as incidental findings in gastrectomies for gastric carcinoma. There were 2 distinct histologic types of polyps: hyperplastic and adenomatous. Hyperplastic polyps, the more common polyp, was randomly distributed in the stomach, whereas, adenomatous polyps were predominatly antral in location. In-situ carcinoma was seen only in adenomatous polyps, which were associated with carcinoma more frequently than hyperplastic polyps. Polyps were divided on the basis of gross description into 3 categories: single polyps, multiple discrete polyps and gastric polyposis; no significant difference in association with carcinoma was found for these types. Only 3 of the patients who underwent surgery for polyps alone developed recurrences and one additional patient developed carcinoma. Simple polypectomy with a rim of uninvolved mucosa seems to be an adequate treatment except for cases with large or multiple polyps where partial gastrectomy may be the treatment of choice.

3906 AN EXPERIMENTAL STUDY OF THROMBOTIC ULCERATION OF THE GASTROINTESTINAL MUCOSA. (E.) Linder, M. M. and D. G. McKay (U. California Sch. Med., San Francisco). *Surg. Gynecol. Obstet.* 133(1):21-29, 1971.

Disseminated intravascular coagulation in rabbits produced hemorrhagic necrosis of the gastric and duodenal mucosa. Epsilon-aminocaproic acid inhibition (of fibrinolysis) preserved the thrombi for a longer period of time and a few small duodenal mucosal hemorrhages resulted. Disseminated intravascular coagulation together with fibrinolysis inhibition and histamine, but not histamine alone, greatly increased the number and size of duodenal hemorrhages. The localization of capillary thrombi and hemorrhagic necrosis shifted from the duodenal to the gastric mucosa following the addition of alpha adrenergic stimulation (norepinephine) to the systemic clotting episode, whereas alpha adrenergic blockade (phenoxybenzamine) completely prevented the localization of thrombi in the gastric mucosa. Vagotomy had little influence on the localization of thrombi. Local vasomotor activity in thrombosis of the microcirculation is apparently important, when the clotting mechanism is triggered systemically.

3907 CHRONIC GASTRITIS IN JAPANESE WITH REFERENCE TO HIGH INCIDENCE OF GASTRIC CARCINOMA. (E.) Imai, T. (Cancer Res. Inst., Fukuoka, Japan), T. Kubo and H. Watanabe. *J. Natl. Cancer Inst.* 47(1):179-195, 1971.

Chronic gastritis, particularly in the antrum, was a change occurring even in apparently healthy stomachs (autopsy) and there was a positive correlation between its incidence and the age of the individuals. There was a strikingly high rate of incidence of chronic gastritis, particularly of the antrum, within the country (Japan) with extremely high risk of gastric cancer, as compared with a low incidence in the United States with extremely low gastric cancer risk. A positive correlation was suggested between chronic gastritis and gastric carcinoma in terms of geographical pathology. In surgical materials, when the comparison between gastric carcinomas in Japan and the United States was restricted to parenchymal changes, considered to have a more immediate relation to gastric carcinogenesis than the exudative changes, the incidence was not the same (intestinal metaplasia was higher in Japan) in materials from different sources.

3908 ENDOSCOPIC OBSERVATIONS OF THE POSTOPERATIVE GASTRIC REMNANT WITH SPECIAL REFERENCE TO CHANGES IN THE GASTROENTEROSTOMY STOMA. (E.) Kawa, K. (Univ. Med. Sch., Osaka City, Japan). *Osaka City Med. J.* 16(1):79-106, 1970.

Following gastrectomy the gastroenterostomy stoma gradually changed its shape from a closed type through a semi-open type to an open type. Inflammatory changes in the mucosa of an anastomosis stoma and its surrounding area usually developed within 3 months postoperatively following the use of silk suture in Albert's suture in gastroenterostomy, especially in those who showed a residue of silk suture. Postoperative symptoms, in those cases subjected to Albert's suture with silk, were greater in the closed and semi-open type groups of the anastomotic stoma. Silk suture used for gastroduodenostomy in animals developed the highest incidence of tissue reaction followed by Tevdek suture and Nylon suture, NCC being the least in the reaction. The use of NCC led to faster changes in the shape of the anastomotic stoma, disappearance of most of the inflammatory changes, and a lower incidence of postoperative sympsoms.

3909 THE ROLE OF RAPID INTESTINAL TRANSIT IN POSTGASTRECTOMY MALNUTRITION. (E.) Winchester, D. P., D. A. Randolph (Evanston Hosp., Ill.), J. M. Dorsey and R. P. Hohf. *Surg. Gynecol. Obstet.* 132(5):861-865, 1971.

Adult mongrel dogs were subjected to total gastrectomy and 5 different types of primary reconstruction. In the first 3 groups continuity was established by esophagojejunostomy; the first of these 3 served as control for the other 2, while an 8-cm long antiperistaltic jejunal segment was constructed proximally in one group and 60 cm distal to the ligament of Treitz in the third group. In the last 2 groups, continuity was established by esophagoduodenestomy, the first group serving as controls for those with reversed jejunal segments placed 60 cm distal to the ligament of Treitz. In dogs with either esophagoduodenostomy or esophagojejunostomy, construction of this antiperistaltic segment 60 cm distal to the ligament of Treitz effectively slowed the small intestine transit time to essentially normal levels, as seen in non-resected dogs, compared with postgastrectomy dogs without reversing segments. This was not observed in postgastrectomy dogs with esophagojejunostomy prepared with a 5 cm antiperistaltic segment placed proximally. None of these procedures were able to improve the nutritional status of postgastrectomy dogs, although weight loss was significantly less in dogs prepared with esophagoduodenostomy compared with esophagojejunostomy.

3910 THE IMPORTANCE OF LYMPH-NODES IN THE ASSESSMENT OF GASTRIC CARCINOMA AT OPERATION. (E.) Cantrell, E. G. (Southmead Hosp., Bristol, England). *Br. J. Surg.* 58(5):384-386, 1971.

In a series of 165 gastric cancer patients who underwent operation, minimal neoplastic invasion of the lymph glands (less than half of the gastric glands) was associated with a 5 year survival rate (35%) almost as high as that for metastases-free patients (46%). The 5 year survival rate was only 8% for patients with maximal neoplastic invasion of lymph nodes. Survival is related to the proportion of local nodes invaded, and is not a function of the absolute presence or absence of secondary spread to lymph glands. Also a retrospective analysis of recorded surgical opinions regarding lymph node metastases demonstrated a poor correlation with the histological evidence of lymph gland invasion by neoplasm. Hence all enlarged lymph nodes need not be metastatic, and even if they are, the prognosis for the patient may yet be good with adequate removal of lymphatic drainage areas.

3911 GASTRIC BEZOAR IN A PATIENT WITH MYOTONIC DYSTROPHY. A REVIEW OF THE GASTROINTESTINAL COMPLICATIONS OF MYOTONIC DYSTROPHY. (E.) Kuiper, D. H. (Michigan State U. Coll. Human Med., East Lansing) *Am. J. Dig. Dis.* 16(6):529-534, 1971.

A case of myotonic dystrophy (Steinert's Disease) in which the patient developed symptoms suggestive of gastric retention is presented. Radiologic and gastroscopic studies revealed polypoid masses in the gastric antrum. Cytologic washings obtained by gastric lavage showed that these masses represented food concretions. Repeat X-rays and gastroscopy revealed normal gastric anatomy with decreased peristalsis in the body and antrum of the stomach. Abnormal gastric motility seemingly predisposed this patient to food concretion formation.

3912 EFFECT OF ANTRONEUROLYSIS ON GASTRIC SECRETION IN DOGS WITH TOTAL GASTRIC FISTULA. (E.) Hall, R. (Gen. Infirm., Leeds, England), C. S. Humphrey, A. R. Wilkinson and D. Johnston. *Br. J. Surg.* 58(4):273-276, 1971.

Antroneurolysis was performed by circumferential sharp dissection in the submucosal plane of the entire gastric antrum, which severs the vagal nerve supply to the antral mucosa. This operative procedure did not produce a significant decrease in the outputs of acid and pepsin in response to pentagastrin, insulin, acetylcholine or meat extract. Antroneurolysis, which might be regarded as a conservative variant of antrectomy, apparently has no place at present in clinical gastric surgery.

3913 PROBLEMS ARISING FROM BENIGN LYMPHOID INFILTRATIONS OF THE STOMACH. ONE CASE

OF A GASTRIC LYMPHOMA ASSOCIATED WITH A JEJUNAL LYMPHOMA. (Fr.) Lapeyrère, J., P. Davidovitch, G. Moreau and L. Rey. *Arch. Fr. Mal. App. Dig.* 60(4-5):247-252, 1971.

3914 GRANULOMATOUS GASTRITIS WITH EPITHELIOID NODULES AND GASTRIC BILHARZIOSIS IN AN AFRICAN NEGRO. (Fr.) Cornet, A. (Laennec Hosp., Paris), L. Brumpt, P. Renault, F. Carnot, G. Terris, J.-P. Barbier and E. Henry-Biabaud. *Arch. Fr. Mal. App. Dig.* 60(4-5):225-234, 1971.

3915 PROTEOLYTIC ACTIVITY IN ATROPHIC GASTRITIS: THERAPEUTIC EVALUATION OF A DIGESTIVE PREPARATION. (Sp.) Schraier, M. (Natl. Inst. Health, Buenos Aires, Argentina), P. A. Mazure and N. Cosen. *Acta Gastroenterol. Lat. Am.* 2(4):203-208, 1970.

3916 SEVERE GASTRIC HEMORRHAGE BY GASTRIC CARCINOMA IN SITU. (Sp.) Ferreira Montero, V. (Jose Antonio Social Security Resid., Zaragoza, Spain) and R. García Lisbona. *Rev. Esp. Enferm. Apar. Dig.* 34(4):405-412, 1971.

3917 POSTGASTRECTOMY SYNDROMES. (E.) Borgström, S. G. (Gen. Hosp., Malmo, Sweden). *Scand. J. Gastroenterol.* 6(Suppl. 9): 37-41, 1971.

3918 GLOMUS ANGIOMA OF THE STOMACH. (Rus.) Likhtman, G. I. *Arkh. Patol.* 33(3): 69-71, 1971.

3919 HISTOPATHOLOGY OF EARLY SUPERFICIAL ELEVATED (TYPE IIa). (Jap.) Taniguchi, H. (Adult Dis. Ctr., Osaka, Japan) and T. Iwanaga. *Stomach Intest. (Tokyo)* 6(1):19-27, 1971.

3920 DEGENERATED GASTRIC SCHWANNOMA. (Rum.) Strat, C. (2nd Med. Clin., Iasi, Rumania), A. Boingeanu and G. Russu. *Viata Med.* 17(20): 945-947, 1970.

3921 INTRAMURAL NEURINOMA OF THE STOMACH, WITH ULCERATION AND BLEEDING FROM THE DIGESTIVE TRACT. (Pol.) Kwiatkowski, C. (Med. Acad. 1st Surg. Clin., Gdansk, Poland) and R. Korski. *Pol. Przegl. Chir.* 42(12):1855-1857, 1970.

3922 SURGERY OF ACUTE GASTRIC PERFORATION. (Hun.) Toth, C. *Orv. Hetil.* 111(52): 3071-3073, 1970.

3923 GASTRIC DIAGNOSIS. (Ger.) Kortge, P. (District Hosp., Detmold, Germany). *Med. Sachverstandige* 66(12):237-244, 1970.

3924 A RELIABLE TECHNIQUE FOR THE INSERTION OF A GASTRIC TUBE DURING OPERATION. (E.) Ogawa, H. (Cleveland Clin. Found., Ohio). *Surg. Gynecol. Obstet.* 132(3):497-502, 1971.

3925 TOTAL GASTRECTOMY CASES OF THE PAST DECADE AT OHTEMAE HOSPITAL. (Jap.) Sugawara, I. (Ohtemae Hosp., Osaka, Japan), K. Kitano and R. Fukada. *Med. J. Mutual Aid Assoc. (Tokyo)* 19(1):29-32, 1970.

3926 HEPATIC ARTERIAL LIGATION ASSOCIATED WITH GASTRECTOMY. REPORT OF SIX CASES WITH A REVIEW OF 36 CASES. (E.) Maetani, S. (Tenri Hosp., Nara, Japan), S. Kashiwara and S. Kuramoto. *Nippon Geka Hokan (Arch. Jap. Chir.)* 39(3):147-164, 1970.

3927 LYMPH NODE METASTASES OF CANCER OF THE CARDIA. (Rus.) Baltaitis, I. V. and V. G. Shlopov. *Klin. Khir.* 50(10):48-51, 1970.

3928 CANCER CELLS IN THE WOUND DURING OPERATIONS FOR CANCER OF THE STOMACH AND LARGE INTESTINE. (Rus.) Vitvitski, K. F. *Klin. Khir.* 50(10):51-53, 1970.

3929 RARE CASES OF SARCOMA OF THE STOMACH. (Rus.) Linchenko, I. F. and E. M. Gumilevskaia. *Klin. Khir.* 50(10):67-69, 1970.

3930 LESIONS OF THE CONFLUENCE OF THE COMMON BILE DUCT AND THE DUCT OF WIRSUNG DUE TO GASTRECTOMY. (Sp.) Couceiro, A. (Lavalle Sanit. Unit, Buenos Aires, Argentina), J. C. Albertengo and S. Vindver. *Medicina (Mex.)* 50(1095):581-585, 1970.

3931 MORPHOLOGIC PATTERN OF SURGICAL WOUNDS OF THE STOMACH. Zagurov, G. *Khirurgiia (Sofiia)* 23(6):540-543, 1970.

3932 SUBDIAPHRAGMATIC VISCERAL DISLOCATION SYNDROME. (Fr.) Iliesco, G. (Alexandru Sahia, Hosp., Bucharest, Rumania). *Chir. Gastroenterol.* 4(4):423-425, 1970.

3933 DIFFERENTIAL DIAGNOSIS OF EXOGASTRIC TUMORS. (E.) Scherer, H. (Tech. U.

Surg. Clin., Munich, Germany), H. Wenzl and M. S. Scheybani. *Zentralkl. Chir.* 96(6):203-207, 1971.

3934 CHEMOTHERAPY OF A CASE OF GASTRIC CANCER. (Ger.) Lang, W. (Ellwangen/Jagst Hosp., Germany). *Med. Welt* 22(9):334-336, 1971.

3935 SYMPTOMLESS RUPTURE OF THE DIAPHRAGM COMPLICATED BY SECONDARY INCARCERATION OF THE STOMACH. (Pol.) Wiechowski, S. (Med. Acad. Dept. Surg., Stettin, Poland). *Pol. Przegl. Chir.* 43(1):119-121, 1971.

3936 A POSSIBLE SOLUTION TO THE VAGOTOMY-ANTRECTOMY AND VAGOTOMY-PYLOROPLASTY CONTROVERSY. (E.) Herrington, J. L., Jr. (Vanderbilt U. Med. Ctr., Nashville, Tenn.). *Am. J. Surg.* 121(3):215-216, 1971.

3937 WOUND INFECTIONS AFTER OPERATIONS ON ACID AND ANACID STOMACHS. (Nor.) Johnson, J. A. (Cent. Hosp., Tromso, Norway), T. Ottesen and T. Godal. *Tidsskr. Nor. Laegeforen.* 91(1):22-24 + 35, 1971.

3938 PROPHYLAXIS AND PATHOGENESIS OF POST-RESECTION GASTRITIS. (Rus.) Vitebski, I. D. *Klin. Khir.* 51(1):35-39, 1971.

3939 THE INCIDENCE OF REMOTE POSTOPERATIVE COMPLICATIONS AFTER RADICAL OPERATIONS FOR GASTRIC CANCER. (Rus.) Patiutko, I. I. *Klin. Med. (Mosk.)* 49(1):61-65, 1971.

3940 THE DIAGNOSIS OF GASTRITIS OF THE DISTAL REGION OF THE STOMACH. (Rus.) Smirnova, N. V. *Klin. Med. (Mosk.)* 49(1):69-71, 1971.

3941 URINARY PEPSINOGEN IN PATIENTS WITH CHRONIC GASTRITIS DEPENDING UPON THE FUNCTIONAL STATE AND MORPHOLOGICAL CHANGES OF THE GASTRIC MUCOUS MEMBRANE. (Rus.) Rakhimov, N. R., T. D. Gul Amov, A. B. Makhmudov and I. T. Kas Mov. *Klin. Med. (Mosk.)* 49(1):72-76, 1971.

3942 THE TREATMENT OF DIARRHEA AND MOTOR DISTURBANCES OF THE STOMACH DEVELOPING AFTER VAGOTOMY. (Rus.) Kurigin, A. A. and S. D. Groisman. *Klin. Med. (Mosk.)* 49(1):65-68, 1971.

3943 SURGICAL TREATMENT OF CHEMICAL LESIONS OF THE STOMACH. (Rus.) Oleshkevich, V. I. *Klin. Khir.* 51(1):42-46, 1971.

3944 RELAPAROTOMY FOR SERIOUS COMPLICATIONS DURING THE EARLY POSTOPERATIVE STAGE OF GASTRIC INTERVENTIONS. (Ger.) Dimakakos, P. S. (Winterthur Hosp., Switzerland). *Helv. Chir. Acta* 37(6):547-558, 1970.

3945 HISTOPATHOLOGIC CHANGES IN THE VAGAL NERVE TRUNKS FOLLOWING GASTROCARDECTOMY. (Rus.) Burtsev, A. N. *Klin. Khir.* 51(1):39-42, 1971.

3946 FREE PERFORATION OF A GASTROCOLIC FISTULA. (E.) Ger, R. (Albert Einstein Coll. Med., Bronx, N. Y.), H. Adler and R. G. Bernstein. *Am. J. Surg.* 112(1):115-116, 1971.

3947 SURGICAL MANAGEMENT OF DIFFUSE HEMORRHAGE FROM GASTRIC MUCOSA. (E.) Matsumoto, T. (Hahnemann Med. Coll., Philadelphia, Pa.), C. C. Wolferth, Jr. and M. F. Hayes, Jr. *Am. J. Surg.* 121(2):129-133, 1971.

3948 SPONTANEOUS GASTRIC ADENOCARCINOMA OF DOGS: A REVIEW. (E.) Lingeman, C. H. (NCI, Bethesda, Md.), F. M. Garner and D. O. N. Taylor. *J. Natl. Cancer Inst.* 47(1):137-153, 1971.

3949 A CASE OF PHYTOBEZOAR DUE TO PERSIMMON FOUND IN THE GASTRIC STUMP. (Jap.) Gocho, Y. (Sapporo Med. Coll., Japan) and M. Kitago. *Stomach Intest. (Tokyo)* 6(1):81-84, 1971.

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3951 X-RAY DIAGNOSIS OF TYPE I EARLY GASTRIC CANCER. (Jap.) Mochizuki, F. (Tohoku U. Sch. Med., Sendai, Japan), M. Kitagawa and S. Hisamichi. *Stomach Intest. (Tokyo)* 6(1):29-35, 1971.

3952 OVERCOMING DIAGNOSTIC DIFFICULTIES IN THE DEPRESSED TYPE OF GASTRIC CANCER WITH EMPHASIS ON CYTOLOGICAL DIAGNOSIS. (Jap.) Okui, K. (Chiba U. Fac. Med., Japan), S. Ihara and K. Iwase. *Stomach Intest. (Tokyo)* 6(2):203-210, 1971.

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3959 GASTROJEJUNAL ULCERS. (Por.) Marques Vieira, O. (U. Rio de Janeiro Sch. Med., Brazil). *Folha Med.* 61(2):93-125, 1970.

3960 GASTRIC AND INTESTINAL CANCER AS A CAUSE OF MORTALITY. (Ser.) Stojkov, N. (Belgrade, Yugoslavia). *Glasnik* 19(2):113-118, 1970.

3961 GASTROSCOPY OF THE RESECTED STOMACH STUMP. (Rus.) Vasiliev, I. V. *Sov. Med.* 34(1):68-72, 1971.

3962 FACTORS CONTRIBUTING TO THE ERRONEOUS CLINICAL DIAGNOSIS OF GASTRIC CANCER. (Rus.) Shnirelman, A. U. and I. L. Rozanov. *Sov. Med.* 34(1):76-80, 1971.

3963 COMPLICATIONS OF POSTGASTRECTOMY SURGERY. (Por.) Rosenberg, D. (Sch. Med., Sao Paulo, Brazil). *Arq. Gastroenterol.* 7(4):227-240, 1970.

3964 SURGICAL TREATMENT OF FUNCTIONAL SEQUELAE OF THE BILLROTH II TYPE PARTIAL GASTRECTOMY. (Fr.) Braconnot, P., P. Vuillard, L. Fischer and J. Venouil. *Cah. Med. Lyon.* 46(41):3437-3442, 1970.

3965 THE OUTCOME OF GASTRIC RESECTION IN ULCER PATIENTS WITH PREOPERATIVE TRAUMA TO THE CENTRAL NERVOUS SYSTEM. (Rus.) Startsev, I. V., V. I. Iukhtin and E. V. Aleksandrova. *Klin. Med. (Mosk.)* 49(1):51-55, 1971.

3966 PHYTOBEZOAR ASSOCIATED WITH A CALLOUS GASTRIC ULCER. (Rus.) Suprunets, L. S. and V. B. Shabeliansk. *Klin. Khir.* 51(1):74, 1971.

See also numbers: 3700, 3832, 3835, 3836, 3852, 3860, 3864, 3865, 3866, 3873, 3878, 4003

PEPTIC ULCERS

3967 INHIBITION OF EXPERIMENTALLY-INDUCED GASTRIC ULCERS IN THE RAT BY A NEW SULFATED GLYCOPEPTIDE. (E.) Prino, G. (Crinos Biol. Res. Labs., Como, Italy), S. Paglialunga, G. Nardi and A. Lietti. *Eur. J. Pharmacol.* 15(1):119-126, 1971.

A new sulfated glycopeptide derived from pig duodenum, administered per os to pyloric-ligated rats reduced ulcer severity. A net decrease of peptic and gastric protease activity was observed. This glycopeptide reduced gastric juice volume and total acid output one hour after pylorus ligation. In hydrocortisone ulcers or stomach lesions produced in rats by drinking a hypertonic glucose solution, ulcers were reduced by oral administration of the sulfated glycopeptide. Also in restraint-induced ulcer, the tested glycopeptide provided protection. A dose-response relationship was always found except for restraint ulcers. The sulfated glycopeptide could act by inhibiting peptic activity.

3968 CORTISONE ACETATE AND STRESS ON THE HEALING PROCESS OF CHRONIC GASTRIC ULCER

IN RATS. (E.) Okabe, S. (U. Tokyo Fac. Pharmaceut. Sci.), R. Saziki and K. Takagi. *J. Appl. Physiol.* 30(6):793-796, 1971.

Intramuscular cortisone (25 mg/kg) slightly aggravated acetic acid induced ulcer in some cases, when given for 5, 10 and 20 days beginning from 1 day or 50 days after operation. A large dose of cortisone acetate such as 75 mg/kg given every day from 1 day after the operation aggravated the 10% acetic acid ulcer by inducing a high rate of perforation. In contrast, repeated cortisone acetate administrations beginning from 50 days after the operation had little aggravating effect. Following water immersion (an acute, severe stress), stress induced ulcers never occurred in or around the acetic acid ulcer in either the acute or the chronic phase, and further aggravation of the acetic acid ulcer itself was not found. Cold stress failed to influence the acetic acid ulcers. The participation of stress in chronicity of gastric ulcer is questionable.

3969 MORPHOLOGY OF EXFOLIATED CELLS IN BENIGN GASTRIC ULCER. (E.) Prolla, J. C., R. G. Xavier and J. B. Kirsner (U. Chicago Dept. Med., Ill.). *Acta Cytol. (Baltimore)* 15(2): 128-132, 1971.

The least degree of cellular atypia, present in almost every instance of benign gastric ulcer, was characterized by moderate nuclear enlargement, chromatin clumping, and by the presence of one or more small round and regular nucleoli. A moderate degree of atypia (50% of patients) included pronounced anisocytosis and anisonucleosis, some nuclear pleomorphism, and large irregular nucleoli. The cells were always exfoliated in groups. Advanced atypia, occasionally indistinguishable from malignancy, was characterized by marked dyskaryosis: nuclear pleomorphism, with irregular nuclear shapes, heavy chromatin clumping and large irregular nucleoli. The most advanced degree of atypia was seen in 2 patients, and was characterized by the presence of isolated atypical cells, closely resembling signet ring cells. These atypias are important to recognize because of the potential diagnostic error.

3970 SELECTIVE GASTRIC VAGOTOMY FOR PEPTIC ULCERATION. A REVIEW OF 100 CONSECUTIVE CASES. (E.) Coupland, G. A. E. (U. Sydney Prof. Subunit Surg., Australia) and V. H. Cumberland. *Med. J. Aust.* 1(18):954-957, 1971.

Bilateral selective gastric vagotomy was performed in 100 consecutive cases mostly for duodenal or gastric ulceration. Satisfactory results were obtained in 96% of cases. Of 68 patients who had a postoperative insulin test performed, 4.5% showed an early positive rise, 23.5% showed a late positive rise and 72% gave a negative response. Total or adequate vagotomy was achieved in 95% of cases. The use of electrical stimulation to test completeness of vagotomy at operation eliminated early positive response to insulin testing. Problems resulting from bilateral selective gastric vagotomy included: subphrenic abscess, wound dehiscence and deep venous thrombosis. Major causes of morbidity following vagotomy-postvagotomy diarrhea and postoperative gastric stasis did not occur. Bilateral selective gastric vagotomy is apparently the operation of choice when vagotomy is indicated for peptic ulcer.

3971 EMERGENCY SURGICAL TREATMENT OF BLEEDING PEPTIC ULCER: AN ANALYSIS OF THE PUBLISHED DATA ON 21, 130 PATIENTS. (E.) Chalmers, T. C. (NIH, Bethesda, Md.), C. S. Sebestyen and S. Lee. *Trans. Am. Clin. Climatol. Assoc.* 82: 188-199, 1970.

Increasing rates of emergency surgical intervention in the last 2 decades have not been accompanied by any decrease in overall case fatality rates. However, there has been a real increase in the mean age of patients admitted during these decades, with a higher mortality in the older patients, suggesting that the overall case fatality rates might have been increasing if therapy had not been improved during this period. Patients admitted for bleeding and destined to have an elective operation for their peptic ulcer before discharge might just as well have it soon after admission, so as not to suffer from the hazards of exanguination.

3972 COMPLETENESS OF VAGOTOMY AND GASTRIC SECRETION STIMULATED BY PENTAGASTRIN DURING OPERATION FOR DUODENAL ULCERS. (E.) Grassi, G. (San Giovanni Hosp., Rome), C. Orecchia, B. Sbuelz, I. Cantarelli and A. Dell'osso. *Chir. Gastroenterol.* 5(1):38-44, 1971.

In 18 of 20 patients who received vagotomy for duodenal ulcer, pH values between 5 and 6.5 were found over the whole acid secreting gastric mucosal surface, in spite of continuous pentagastrin administration. After incomplete vagotomy there was an acid secretion response to pentagastrin in the areas of gastric mucosa which were left innervated. Acetylcholine rather than histamine or pentagastrin may be the last effector to reach the parietal cells in stimulating acid secretion. This theory is favored by lack of acid response both after histamine (previously reported) and after pentagastrin following complete vagotomy.

3973 A CLINICAL EVALUATION OF A NEW CONCENTRATED ANTACID. I. EFFECTS ON GASTRIC pH. (E.) Powell, R. L. (Smith Kline & French Labs., Philadelphia, Pa.), W. J. Westlake, E. D. Longaker and L. C. Greene. *J. Clin. Pharmacol.* 11(4):288-295, 1971.

The intragastric effects of a concentrated antacid formulation (14.4% aluminum hydroxide, 7.0% magnesium hydroxide and 7.5% calcium carbonate) were studied in chronic duodenal ulcer patients. The pH following the concentrated antacid was significantly higher than that following the control antacid at each time interval through 120 min. The mean duration of action of the new antacid was significantly longer at each pH (3.0, 3.5 and 4.0) level. While it is disputed whether or not an ulceration heals faster or is less likely to recur as a result of adequate antacid therapy, it is generally conceded that antacids are effective in relieving the pain characteristic of this disease. The concentrated antacid formulation above should be particularly useful as adjunctive therapy in peptic ulcer disease, providing prolonged gastric pH elevation (and possibly peptic inactivation) following conventional 15 ml doses in most patients..

3974 A CLINICAL EVALUATION OF A NEW CONCENTRATED ANTACID. II. SAFETY AND EFFICACY IN DUODENAL ULCER PATIENTS. (E.) Powell, R. L. (Smith Kline & French Labs., Philadelphia, Pa.), W. J. Westlake, E. D. Longaker and L. C. Greene. *J. Clin. Pharmacol.* 11(4):296-300, 1971.

There was a greater proportion of excellent responses (complete relief of pain and/or other presenting symptoms) in the duodenal ulcer group treated with a new concentrated antacid (14.4% aluminum hydroxide, 7.0% magnesium hydroxide and 7.5% calcium carbonate) than in the group treated with magnesium aluminum hydroxide gel. Laxation was the most commonly reported effect for either group. The concentrated antacid group had a slightly greater proportion of patients reporting loose or soft stools and the control group had a greater proportion of patients reporting constipation. No significant drug-related changes in any laboratory value were discernible. However, both groups exhibited a slight, unexplained trend toward higher serum calcium levels. The concentrated antacid is apparently more effective than the control antacid as adjunctive therapy in peptic ulcer disease.

3975 A RARE COMPLICATION AFTER OVERSEWING OF A PERFORATED GASTRIC ULCER. (Ger.) Staffen, A. (Univ. 2nd Surg. Klin., Vienna, Austria). *Wien. Klin. Wochenschr.* 83(3):51-52, 1971.

3976 GIANT GASTRIC ULCER. (16 CASES.). (Sp.) Montero-Garcia, M. (Sch. Med., Granada, Spain), F. Garcia-Moreno and J. Pelaez-Redondo. *Rev. Esp. Enferm. Apar. Dig.* 34(4): 365-374, 1971.

3977 THE INCIDENCE OF RECURRENT GASTRIC ULCER AND ITS CLINICAL COURSE AND TREATMENT. (Jap.) Hara, Y. (Niigata Cancer Ctr., Japan). *Stomach Intest. (Tokyo)* 5(13):1619-1626, 1970.

3978 EARLY COLLAPSE IN PERFORATED GASTRODUODENAL ULCER. (Rum.) Dimitriu, C. (Urgenta Municipal Hosp., Bucharest, Rumania). *Viata Med.* 17(20):927-932, 1970.

3979 SURGICAL TREATMENT OF JUXTACARDIAC GASTRIC ULCER. (Sp.) Mauř, M. (Hosp. Gastroenterol., Buenos Aires, Argentia), J. Caffarello and A. Iorio. *Prensa Med. Argent.* 57(41):1906-1908, 1970.

3980 TRENDS IN SURGERY FOR DUODENAL ULCER. (E.) Sonneland, J. (Deacon. Hosp., Spokane, Wash.). *Am. J. Surg.* 121(3):255-259, 1971.

3981 SURGICAL TREATMENT OF GASTRIC ULCER. (Por.) Nogueira, C. E. D. (Fed. U. Minas Gerais Sch. Med., Brazil). *Rev. Assoc. Med. Minas Gerais* 21(3):145-160, 1970.

3982 ETIOLOGY OF GASTRIC AND DUODENAL ULCERS. (Pol.) Piskorz, A. (Med. Acad. 1st Surg. Clin., Poznan, Poland) and M. Sarnowski. *Pol. Przegl. Chir.* 42(12):1757-1766, 1970.

3983 POST-RESECTION SYNDROME SEEN IN FIVE YEARS OF PATIENT MATERIAL. (Hun.) Szigethy, J. (Varosi Hosp., Kazincbarcika, Hungary) and E. Olah. *Orv. Hetil.* 111(50):2959-2963, 1970.

3984 ACUTE HEMORRHAGIC EROSIONS AND ULCERS OF THE STOMACH AND DUODENUM AFTER OPERATION. (Pol.) Ciesielski, L. (Med. Acad. 1st Surg. Clin., Lodz, Poland), W. Trojanowski and A. Zielinski. *Pol. Przegl. Chir.* 43(1):65-71, 1971.

3985 DIAGNOSIS OF MULTIPLE GASTRIC ULCERS. (Pol.) Kulicz, A. (Med. Acad. 3rd Surg. Clin., Bytom, Poland), M. Gruk and J. Rudzki. *Pol. Przegl. Chir.* 42(12):1793-1796, 1970.

3986 GASTRIC ULCER IN THE AGED. (It.) Vidal, B. (Civil Hosp., Udine, Italy), P. Rossi and P. Gherardini. *Minerva Med.* 61(94):5382-5386, 1970.

3987 COMPARISON OF ASPIRATION GASTROBIOPSY DATA WITH INDICES OF THE RADIOESTIMATION OF THE INTRAGASTRIC BASAL pH IN PATIENTS WITH PEPTIC ULCER. (Rus.) Chernobrovii, V. N. *Klin. Med. (Mosk.)* 49(1):42-47, 1971.

3988 EXPERIENCE WITH A NEW TREATMENT OF DUODENAL ULCER. (Bul.) Andreev, T. and T. Todorov. *Khirurgiia (Sofiia)* 23(6): 581-585, 1970.

3989 PROFUSE BLEEDING FROM GASTRODUODENAL ULCERS IN UREMIA. (Bul.) Kulov, N. *Khirurgiia (Sofiia)* 23(6):537-540, 1970.

3990 EXPERIENCE IN THE TREATMENT OF COMPLICATIONS OF DUODENAL ULCER BY VAGOTOMY AND PYLOROPLASTY. (Gr.) Vasilakis, J., V. Mantzaris and J. Boudouris. *Hellen. Armed Forces Med. Rev.* 4(6):789-793, 1970.

3991 SELECTIVE VAGOTOMY AND TOTAL VAGOTOMY. (Fr.) Govaerts, J. P. (U. Brussels Sch. Med., Belgium). *Brux. Med.* 50(12):1097-1101, 1970.

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3993 ASSOCIATION OF GASTRIC OR DUODENAL ULCER WITH CARDIOSPASM. (Rus.) Baiev, V. K. *Klin. Khir.* 51(1):31-35, 1971.

3994 THE IMPORTANCE OF FREQUENT MEALS IN THE COMPLEX TREATMENT OF PEPTIC ULCER. (Rus.) Menshikov, F. K., A. S. Belousov and L. G. Rakitskaia. *Klin. Med. (Mosk.)* 49(1):82-89, 1971.

3995 DEGENERATED PEPTIC ULCER. (Fr.) Loussouarn, J. and J. Turpin. *Concours Med.* 93(6):859-869, 1971.

3996 RESULTS OF SURGICAL TREATMENT OF BENIGN GASTRIC ULCER. A REVIEW OF 95 CASES. (E.) Browne, H. J. (Richmond-St. Michael's Hosp., Dublin, Ireland). *J. Ir. Med. Assoc.* 64(403):3-6, 1971.

3997 DUODENAL ULCER STENOSIS WITH GASTRIC DILATATION. TREATMENT BY VAGOTOMY AND PYLOROPLASTY. (E.) Davis, N. P. (Gen. Hosp., Birmingham, England) and J. A. Williams. *Am. J. Surg.* 121(3):260-262, 1971.

3998 CLINICAL TRIAL OF VAGOTOMY AND PYLOROPLASTY IN THE TREATMENT OF BENIGN GASTRIC ULCER. (E.) Sawyers, J. L. (Vanderbilt U. Med. Ctr., Nashville, Tenn.), H. W. Scott, Jr. and C. Graham. *Am. J. Surg.* 121(2):119-121, 1971.

3999 CONSERVATIVE MANAGEMENT OF PEPTIC ULCER. (Ger.) Rosch. W. (Univ. Med. Clin., Erlangen, Germany). *Aerztl. Prax.* 23(10):513-515, 1971.

4000 VAGOTOMY AND THE GASTRIC ULCER. (E.) Kraft, R. O. (St. Joseph Mercy Hosp., Ann Arbor, Mich.), J. Myers, S. Overton and W. J. Fry. *Am. J. Surg.* 121(2):122-128, 1971.

4001 ULCERS - GASTRECTOMY - DUMPING SYNDROME. THE PSYCHOSOMATIC ASPECT. (Fr.) Burger, A. J., J. C. Le Parco, Y. Le Quintrec and A. Lambling. *Concours Med.* 92(52):9701-9704, 1970.

4002 PERFORATED ULCER IN PATIENTS WITHOUT A HISTORY OF ULCERS. (Ser.) Bukurov, S. (U. Belgrade Sch. Med., Yugoslavia) and R. Pesic. *Srp. Arh Celok. Lek.* 98(3):407-413, 1970.

4003 POSTOPERATIVE RECURRENCE OF GASTRODUODENAL ULCER. (Fr.) Vuillard, P., J. Venouil, L. Fischer and P. Braconnot. *Cah. Med. Lyon.* 47(3):171-185, 1971.

4004 GASTRIC ULCER PENETRATING THE LEFT VENTRICLE. (E.) Macgillivray, J. B. (Westminster Hosp., London) and M. N. Morgan. *Br. J. Surg.* 58(2):154-155, 1971.

4005 STRESS ULCER IN PRE-ECLAMPSIA AND ECLAMPSIA. (Por.) Schuwartz Tannouz, M. C., S. Gomes, M. De L. Tannouz, J. Specterow and M. P. Guimares. *Rev. Bras. Cir.* 60(3-4):207-210, 1970.

4006 LEVELS OF ALANINE AND ASPARTIC AMINOTRANSFERASES FOLLOWING TOTAL AND SELECTIVE VAGOTOMY FOR DUODENAL ULCER. (Pol.) Lewicki, K. (Med. Acad. 3rd Surg. Clin., Gdansk, Poland). *Pol. Przegl. Chir.* 43(4):545-552, 1971.

4007 PEPTIC ULCER OF THE STOMACH. STRANGULATED PYLORUS. (Por.) Raymundo, G. (Getulio Vargas, State Hosp., Rio de Janeiro, Brazil). *Rev. Med. Estado Guanabara* 37(3):360-369, 1970.

4008 THE TREATMENT OF GASTRODUODENAL PERFORATING ULCERS. (Bul.) Todorov, T. *Khirurgiia (Sofiia)* 23(5):428-433, 1970.

4009 PREVENTION OF RELAPSES IN INDUSTRIAL WORKERS SUFFERING FROM GASTRIC AND DUODENAL ULCER. (Rus.) Svistunova, I. A. *Sov. Med.* 33(12):58-62, 1970.

4010 COMPLICATED GASTRODUODENAL ULCERS MASKED BY CARDIOVASCULAR DISEASES. (Rus.) Podonenko, A. P. *Sov. Med.* 34(1):65-68, 1971.

4011 FEATURES SPECIFIC TO THE CLINICAL COURSE OF FAMILIAL PEPTIC ULCER. (Rus.) Artemiev, E. N. and M. O. Vildt. *Sov. Med.* 34(1): 10-13, 1971.

4012 IRON METABOLISM IN PEPTIC ULCER. (Rus.) Petrov, V. N. and M. M. Scherba. *Sov. Med.* 34(1):13-17, 1971.

4013 VAGOTOMY IN ELDERLY ULCER PATIENTS. (It.) Grassi, G. (St. Spirito Inst. Rome) and C. Orecchia. *Minerva Chir.* 26(2):78-81, 1971.

4014 PHARMACOLOGICAL CONTROL OF UPPER GASTROINTESTINAL BLEEDING. (E.) *Br. Med. J.* 1(5749):569-570, 1971.

See also numbers: 3668, 3701, 3704, 3856, 4019, 4117, 4267

SMALL INTESTINE

4015 NONOPERATIVE TREATMENT OF MECONIUM ILEUS. AN EXPERIMENTAL STUDY IN RATS. (E.) Schiller, M. (Ohio State U. Med., Columbus), J. L. Grosfeld and T. S. Morse. *Am. J. Surg.* 122(1):22-26, 1971.

A standard suspension of barium sulfate mixed with various concentrations of N-acetyl cysteine was instilled both within and proximal to a blind loop created between distal ileum and proximal colon. High concentrations (10 and 20%) caused significant damage to the intestinal wall including acute mucosal inflammation, submucosal edema and small intestinal villus blunting. Severe fluid depletion was also noted. The gross and microscopic appearance of 28 of 33 rats treated with a 4% N-acetyl cysteine-barium mixture was normal. Nine of 12 rats receiving the above 4% mixture by barium enema had a normal histologic appearance of the small intestine. Such a mixture could be applied clinically for the nonoperative management of selected cases of uncomplicated meconium ileus.

4016 EFFECT OF BOWEL EXPOSURE ON BODY TEMPERATURE DURING SURGICAL OPERATIONS. (E.) Roe, C. F. (Yale U. Sch. Med., New Haven, Conn.). *Am. J. Surg.* 122(1):13-15, 1971.

Exposure of most of the small and large intestine to the air had a substantial effect on the heat loss sustained during anesthesia and operation. The intraoperative fall in body temperature in rabbits with intestine exposed (Group 3) was more than double that of the unoperated upon animals, (Group 1) and almost double that of animals whose bowels were eviscerated but not exposed to the air (Group 2). The rectal temperature differences between Groups 1 and 2 was due to the radiative heat loss from the warm exteriorized bowel. The difference between Groups 2 and 3 was due to the evaporative heat loss from the moist bowel. When the cold bowel was returned to the abdomen, the cooling effect on the whole body resulted in a brisk fall in rectal temperature. This problem can be avoided by enclosing the intestine in a plastic envelope and irrigating the abdominal cavity with warm saline solution after the bowel has been returned to the abdominal cavity.

4017 MECONIUM ILEUS: A CRITICAL REVIEW OF TREATMENT AND EVENTUAL PROGNOSIS. (E.) Kalayouglu, M. (U. Pittsburgh Sch. Med., Pa.), W. K. Sieber, J. B. Rodnan and W. B. Kiesewetter. *J. Pediatr. Surg.* 6(3):290-300, 1971.

Twenty-three of 46 patients with meconium ileus, treated from 1951-1969, died in the immediate postoperative period. Long-term survival in patients with meconium ileus is not different from patients with cystic fibrosis with or without meconium ileus. Verification of the diagnosis of meconium ileus rests upon the laboratory demonstration of abnormal sweat electrolytes or pancreatic changes of cystic fibrosis at necropsy. The intestine distal to intestinal atresia may be filled with gummy pellets of light-green meconium identical with the findings in the distal intestine in meconium ileus; however, the absence of cystic fibrosis negates the diagnosis of meconium ileus. Colonic perforation, a surprising finding, was present in 3 patients. The majority of these patients were treated by enterotomy and hydrogen peroxide or acetylcystine irrigation.

4018 PREVENTION OF INDOMETHACIN-INDUCED INTESTINAL ULCERS BY VARIOUS CATATOXIC STEROIDS. (E.) Selye, H. (U. Montreal Inst. Exp. Med. Surg., Quebec, Canada). *Exp. Med. Surg.* 28(2):169-178, 1971.

Indomethacin produced a 10% incidence of both gastrointestinal ulcers and mortality in the control group of rats. All groups receiving steroids (ethylestrenol, compound SC-11927, spironolactone, norbolethone and oxandrolone) whose catatoxic potency had been previously established, offered perfect protection. However, steroids (deoxycorticosterone and hydroxydione) previously shown to be devoid of catatoxic actions failed to protect the rat against indomethacin-induced ulcers. Triamcinolone failed to prevent the development of intestinal ulcers and mortality but totally prevented the peritonitis. Prednisolone prevented jejunal ulcer formation but did not completely abolish mortality. However, both compounds caused multiple hepatic abscesses which were virtually constant after treatment with either of these steroids. The mechanism chiefly responsible for the protective effect of some of the steroids was probably induction of drug metabolizing enzymes in the hepatic microsomes.

4019 DISACCHARIDASE LEVELS IN THE SMALL INTESTINE IN PATIENTS WITH DIARRHOEA FOLLOWING VAGOTOMY AND PYLOROPLASTY. (E.) Garcia-Paredes, J. (City U. Clin. Hosp., Madrid) and S. C. Truelove. *Gut* 12(2):107-109, 1971.

Records were reviewed of 556 patients treated by vagotomy and pyloroplasty for duodenal ulcer (443), gastric ulcer (45), duodenal and gastric ulcer (11), hiatal hernia (24), duodenal ulcer and hiatal hernia (23) and for other causes (10). Diarrhea was seen postoperatively in 119 (21.4%), of whom 23 later were subjected to successful jejunal biopsy at 2-6 years after surgery. The dissecting microscope appearance of biopsy specimens was normal in all but 2, 1 of whom showed a mixture of ridges on convolutions macroscopically and minor villous abnormality microscopically while the other (the single patient with hypolactasia) showed a mixture of leaf-shaped villi, ridges and convolutions macroscopically and partial villous atrophy microscopically. Ranges and mean levels of dissccharidases were: lactase, 1.2-9.9, 5.37; sucrase, 5-17.4, 10.34; maltase, 4.4-35.3, 18.25. These were normal in all but the single patient with hypolactasia. The single patient with hypolactasia showed a normal lactose tolerance test and has become symptom-free on a lactose-free diet.

4020 EFFECTS OF OPEN AND CLOSED DECOMPRESSION ON THE WATER CONTENT AND MOTILITY OF EXPERIMENTALLY OBSTRUCTED SMALL BOWEL IN THE RABBIT. (E.) Sheilds, M. A. (Monash U. Dept. Surg. Victoria, Australia) and H. A. F. Dudley. *Br. J. Surg.* 58(5):337-339, 1971.

Experimentally induced (ligation) obstruction of the rabbit lower small intestine caused an average 7.4% gain in weight due to water (edema). There was a nonsignificant decline of mean water content 24 hr after relief of obstruction in all 3 groups: simple relief of obstruction, relief with suction enterotomy (open decompression), and relief with stripping of small intestinal contents into the cecum (closed decompression). Animals with relief by stripping had increased intestinal edema at 12 hr compared to the 2 other groups. Recovery of motility (fluctuations in intraluminal pressure) was unaffected by the temporary increase in edema or by surgical decompression. Peritonitis had a higher incidence among the animals receiving open decompression, hence a closed technique should be chosen whenever decompression is appropriate.

4021 AUTOGRAFTING OF SMALL-BOWEL MUCOSA. (E.) Wapnick, S. (Univ. Coll. Rhodesia, Salisbury). *Br. J. Surg.* 58(4):285-287, 1971.

Small intestine mucosa was grafted to the denuded inner submucosal surface of the colon and to the gastric serosa of rabbits and goats. Fourteen days after grafting in 5 of 6 goats and 2 of 3 rabbits, the small intestinal mucosal graft had become firmly attached to the colonic submucosal layer. At seven days after grafting the small intestine mucosa appeared normal, although inflammatory cells were present in large numbers. The small intestine mucosa became anchored to the serosa of the stomach in 2 of 3 cases where this procedure was performed. The grafting of small intestine mucosa to ectopic sites in the alimentary tract may be of some clinical application. For example, an enteric lined colon tube would supplement the function of the residual small intestine and could be of value for patients who have had an extensive resection of the small intestine and suffer from persistent malabsorption.

4022 FUNCTION OF REPLANTED ILEAL SEGMENTS IN THE DOG. (E.) Kottmeier, P. K. (State U. New York Downstate Med. Ctr., Brooklyn), W. S. Brennom, N. Nakajima, J. L. Botelho-Machado and C. Dennis. *J. Pediatr. Surg.* 6(3):345-353, 1971.

In 13 of 21 ileal replantations, vascular compromise occurred within 5 days postoperatively, mainly due to arterial thrombosis caused by incomplete eversion of the intima during the anastomosis. Chloride and water absorption was unimpaired. Ovalbumin did not cross the ileal mucosa after exposure to the test solution alone, indicating normal mucosal permeability; however, after hypertonic damage to the mucosa, ovalbumin was found in the serum. Cephalad-caudad propulsion was maintained in the denervated replanted segment. Sky blue injected into the mesenteric lymphatics of the replanted ileal segments showed prompt cross over into the portal mesenteric lymphatics at the site of vascular anastomoses within 2 months postoperatively. The replanted ileal segment, after removal of the remaining small intestine, is apparently adequate to sustain life.

4023 GANGLION CELL CHANGES IN EXPERIMENTAL STENOSIS OF THE GUT. (E.) Earlam, R. J. (London Hosp.). *Gut* 12(5):393-398, 1971.

Experimental stenosis of the canine terminal ileum was induced by wrapping Teflon mesh around the small intestine. The intestine was usually enlarged for at least 15 cm proximally. The circular and longitudinal muscle were thickened, the circular smooth muscle being more hypertrophied. The number of ganglion cells was related to the total mass of longitudinal muscle and circular muscle. In every case above the stenosis the ganglion cell count was reduced (between 20 and 50%) and was more marked when muscle hypertrophy was greatest. The individual ganglion cells were larger above the stenosis, in both Auerbach's and Meissner's plexus. There may be 2 types of smooth muscle hypertrophy of the intestine. In the first type, associated with an increase in the number of ganglion cells, there is either obstruction distally or intestinal overactivity for some other reason, as in ulcerative colitis or regional enteritis. In the second type, associated with a decrease in ganglion cell number, the intestine is hypertrophied to compensate for its inefficiency, which is caused by the ganglion cell changes e.g. in Chagas disease, congenital pyloric stenosis or diffuse esophageal spasm.

4024 INTESTINAL CRYPT SURVIVAL AND TOTAL AND PER CRYPT LEVELS OF PROLIFERATIVE CELLULARITY FOLLOWING IRRADIATION: SINGLE X-RAY EXPOSURES. (E.) Hagemann, R. F. (Allegheny Gen. Hosp., Pittsburgh, Pa.), C. P. Sigdestad and S. Lesher. *Radiat. Res.* 46(3):533-546, 1971.

An intestinal crypt survival curve, obtained by measuring crypts/mg jejunum in mice, was characterized by a OD of 330R and n of 10. Although crypt size varied, crypt survival was quantitatively similar for assays performed at 3 and 4 days. Following irradiation, recovery (in terms of increased cell number) per surviving crypt was not appreciably dose dependent. A crypt with a single surviving cell will regain its cellularity essentially independent of magnitude of exposure. The salient aspect with respect to 5 day survival of the animal was the number of crypts which contain at least one surviving cell, i.e., crypt survival.

4025 INTESTINAL ADAPTATION TO SMALL BOWEL RESECTION. (E.) Weser, E. (U. Texas Med. Sch., San Antonio). *Am. J. Clin. Nutr.* 24(1):133-136, 1971.

4026 CONTINUOUS DRAINAGE AS A METHOD IN COMPLICATIONS OF INTESTINAL OBSTRUCTION. (Rus.) Topchibashev, I. M., G. E. Allakhverdiev. *Klin. Khir.* 50(10):65-66, 1970.

4027 FATAL EPILEPTIC STATE IN THE RECOVERY PERIOD AFTER SURGICAL TREATMENT OF ILEUS OF THE SMALL INTESTINE. (Ger.) Holub, K. (Wilhelmine Hosp., Vienna, Austria). *Wien. Med. Wochenschr.* 120(47):851-852, 1970.

4028 SURGICAL TREATMENT OF CHRONIC ARTERIOMESENTERIC COMPRESSION OF THE DUODENUM. (Bul.) Rumenov, I., V. Stratiev and I. Isakov. *Khirurgiia (Sofiia)* 23(6):544-547, 1970.

4029 PERFORATION OF MECKEL'S DIVERTICULUM. (Rus.) Kostiuk, V. I. *Klin. Khir.* 50(10):74, 1970.

4030 A RARE CASE OF INTESTINAL OBSTRUCTION. (Rus.) Smelski, V. V. *Klin. Khir.* 50(10):72-73, 1970.

4031 SPONTANEOUS PERFORATION OF THE SMALL INTESTINE IN INFANTS. (Dut.) Emmery, L. (St. Rafael Acad. Hosp., Leuven, Belgium), R. Kerremans, V. Desmet and E. Eggermont. *Acta Paediatr. Belg.* 24(5):539-555, 1970.

4032 SURGERY AFTER MASSIVE SMALL BOWEL RESECTION. (E.) Burrington, J. D. (U. Colorado Med. Ctr., Denver). *Am. J. Surg.* 121(3):213-214, 1971.

4033 CURRENT TREATMENT OF MECONIUM ILEUS. (Fr.) Moyson, F. (Brugmann U. Hosp., Brussels, Belgium). *Acta Paediatr. Belg.* 24(5):481-492, 1970.

4034 THE TREATMENT OF PERITONITIS AND POSTOPERATIVE ILEUS BY RELAPAROTOMY, ENTEROTOMY AND ASPIRATION OF THE INTESTINE. (Ger.) William, K. (Prenzlauer Berg State Hosp., Berlin). *Zentralbl. Chir.* 96(3):65-69, 1971.

4035 INTERMITTENT INTUSSUSCEPTION OF THE JEJUNUM. (E.) Sewell, R. L. (1221 W. Lancaster, Fort Worth, Tex.). *Tex. Med.* 67(1):106-109, 1971.

4036 A SINGLE LAYER EVERTING AND INVERTING SUTURE USED FOR INTESTINAL ANASTOMOSES IN DOGS. (Pol.) Janiak, W. (Clin. Pediatr. Surg., Warsaw, Poland) and Z. Kalicinski. *Pol. Przegl. Chir.* 43(1):93-96, 1971.

4037 PRIMARY DIVERTICULOSIS OF THE ENTIRE SMALL INTESTINE COEXISTENT WITH GASTRIC CARCINOMA. (Pol.) Jesipowicz, M. (Med. Acad. 1st Surg. Clin., Lublin, Poland) and A. Sawa. *Pol. Przegl. Chir.* 43(1):103-105, 1971.

4038 EARLY DIAGNOSIS OF MECHANICAL ILEUS OF THE SMALL INTESTINE. (Hun.) Lazarits, J. (V. B. Ujpesti Municipal Hosp., Budapest, Hungary), S. Nagy and N. Horvath. *Orv. Hetil.* 112(6):316-320, 1971.

4039 X-RAY DIAGNOSIS OF MALIGNANT TUMORS OF THE DUODENUM. (Rus.) Gerlants, A. I. *Klin. Med. (Mosk.)* 49(1):140-143, 1971.

4040 PSYCHOLOGICAL PROBLEMS FOLLOWING ILEOSTOMY AND COLOSTOMY. (E.) Prudden, J. F. (Columbia U. Coll. Physicians Surg., New York, N. Y.). *Cancer* 28(1):236-238, 1971.

4041 ROLE OF ENTEROSTOMAL THERAPISTS AND STOMA REHABILITATION CLINICS. (E.) Lenneberg, E. (New England Deaconess Hosp., Boston, Mass.). *Cancer* 28(1):226-229, 1971.

4042 PANCREATICODUODENECTOMY FOLLOWING ABDOMINAL TRAUMA. (E.) Nance, F. C. (Louisiana State U. Med. Ctr., New Orleans) and D. H. DeLoach. *J. Trauma* 11(7):577-585, 1971.

4043 CARCINOID ISLET CELL TUMORS OF THE DUODENUM. REPORT OF TWENTY-ONE CASES. (E.) Weichert, R. F. (Tulane U. Sch. Med., New Orleans, La.), L. M. Roth and E. T. Krementz. *Am. J. Surg.* 121(2):195-205, 1971.

4044 CROHN'S DISEASE OF THE DUODENUM. A REPORT AND ANALYSIS OF ELEVEN NEW CASES. (E.) Wise, L. (Washington U. Sch. Med., St. Louis, Mo.), M. Kyriakos, A. McCown and W. F. Ballinger. *Am. J. Surg.* 121(2)·184-194, 1971.

4045 A RADIOLOGICAL STUDY OF THE SMALL INTESTINE IN CHILDREN SUFFERING FROM HYPOCHROMIC ANEMIA. (Fr.) Fortier Beaulieu, M. (Necker Sch. Med., Paris), A. Bonnin and J. Lefebvre. *Ann. Radiol.* 14(3-4):271-278, 1971.

4046 CHANGES IN INTESTINAL ALKALINE PHOSPHATASE IN BOWEL ISCHEMIA. (E.) Rosato, F. E. (U. Pennsylvania Dept. Surg., Philadelphia, Pa.), L. Lazitin, L. D. Miller and K. G. Tsou. *Am. J. Surg.* 121(3):289-292, 1971.

4047 CONGENITAL DUODENAL STENOSIS IN AN ADULT PRESENTING WITH SEVERE ELECTROLYTE IMBALANCE. (E.) Ward, E. E. (U. West Indies Dept. Physiol., Kingston, Jamaica), E. R. Walrond and J. S. Davison. *Br. J. Surg.* 58(3):238-241, 1971.

4048 INTRAMURAL HEMATOMA OF THE DUODENUM: AN UNUSUAL COMPLICATION OF SMALL BOWEL BIOPSY. (E.) Mullinger, M. (U. British Columbia Dept. Pediatr., Vancouver, Canada), B. J. Wood, M. R. Kliman and G. C. Robinson. *J. Pediatr.* 78(2):323-326, 1971.

4049 INTESTINAL PERFORATION BY A FISH BONE. (Rus.) Nikishenko, A. A. *Klin. Khir.* 51(1):74-75, 1971.

4050 STUDIES OF POLYCYCLIC HYDROCARBON HYDROXYLASES OF THE INTESTINE POSSIBLY RELATED TO CANCER. EFFECT OF DIET ON BENZPYRENE HYDROXYLASE ACTIVITY. (E.) Wattenberg, L. W. (U. Minnesota Med. Sch., Minneapolis). *Cancer* 28(1):99-102, 1971.

4051 SMALL BOWEL OBSTRUCTION SECONDARY TO ATHEROMATOUS EMBOLISM: A CASE REPORT AND REVIEW OF THE LITERATURE. (E.) Mulliken, J. B. and M. K. Bartlett (Massachusetts Gen. Hosp., Boston). *Ann. Surg.* 174(1):145-150, 1971.

4052 MUCOCUTANEOUS LUPUS VULGARIS WITH COINCIDENTAL PEUTZ-JEGHERS SYNDROME: REPORT OF A CASE. (St. Finbarr's Hosp., Cork, Ireland) and J. G. Russell. *J. Oral Surg.* 29(2):141-143, 1971.

4053 LYMPHANGIOMA OF THE MESENTERY OF THE ILEUM. (Sp.) Sarrias Batista, A. *Barcelona Quir.* 14(5):372-379, 1970.

4054 FIBRINOGEN CHANGES IN INTESTINAL OBSTRUCTION. (Rum.) Lepadat, P. (Colentina Hosp., Bucharest, Rumania), C. Olteanu and G. Popescu. *Viata Med.* 17(18):863-864, 1970.

4055 DIFFERENTIAL DIAGNOSIS BETWEEN POSTOPERATIVE PARALYTIC ILEUS AND ILEUS DUE TO ADHESIONS. (Ger.) Eigler, F. W. (Univ.

Surg. Clin., Cologne, Germany), A. Kallenberg and V. Zumtobel. *Therapiewoche* 20(26):1288-1292, 1970.

4056 VOLVULUS OF SMALL INTESTINE, NECROSIS OF SIGMOID AND FULL TERM PREGNANCY. (Fr.) Ficini, R. (Mohammed V. Hosp., El Jadida, Morocco). *Maroc Med.* 50(541):732-735, 1970.

4057 INTESTINAL TUBERCULOSIS. Ledru. *Grenoble Med. Chir.* 8(13):609-616, 1970.

4058 DIAGNOSIS OF PRIMARY MALIGNANT TUMORS OF THE SMALL INTESTINE. Vuori, J. V. A. (Univ. Surg. Clin., Turku, Finland). *Duodecim* 86(22):1306-1314, 1970.

4059 CAUSES OF UNFAVORABLE OUTCOME IN ACUTE INTESTINAL OBSTRUCTION. (Rus.) Josset, G. I. and I. I. Koscher. *Vestn. Khir.* 105(7):30-33, 1970.

4060 INTESTINAL ILEUS. (Dut.) Kuijjer, P. J. (Nat. U. Groningen, Netherlands). *Ned. Tijdschr. Geneeskd.* 115(2):53-59, 1971.

4061 A RARE MALFORMATION: INTRALUMINAL DIVERTICULA OF THE DUODENUM. (Fr.) Langumier, J., J. Roumetz and J. Rouffiat. *J. Radiol. Electrol. Med. Nucl.* 52(1-2):116-121, 1971.

4062 CANCER AT TREITZ'S ARCH. (Fr.) Ionescu, D. *J. Radiol. Electrol. Med. Nucl.* 52(1-2):37, 1971.

4063 ACUTE INTESTINAL INTUSSUSCEPTION IN INFANTS. (Fr.) Berger, J., P. Sauvage, P. Bronn and M. Levy. *J. Med. Strasbourg* 1(11): 695-701, 1970.

4064 INCOMPLETE ROTATION OF THE SMALL INTESTINE AND COLON. (Pol.) Szczepski, O. (Med. Acad. 2nd. Clin. Child. Dis., Poznan, Poland), J. Korbas and E. Korman. *Wiad. Lek.* 24(1):73-76, 1971.

4065 PATHOLOGIC PHYSIOLOGY AND TREATMENT OF INTESTINAL OBSTRUCTION IN THE NEWBORN AND INFANT. (Rum.) Botez, R. (Inst. Med., Iasi, Rumania) and G. Ionescu. *Rev. Med. Chir. Iasi* 74(3):583-590, 1970.

4066 JEJUNO-ILEOSTOMY IN THE TREATMENT OF OBESITY. (Fr.) Leger, L. (Cochin Hosp., Paris), M. Zara, P. Moulle and T. Dentan. *Chirurgie* 96(14):949-957, 1970.

4067 DUODENAL DIVERTICULOSIS AND CHRONIC DIARRHOEA. (E.) Brey, O. A. (Epsom Dist. Hosp., England), E. P. R. Garner, R. G. Twycross and D. Wells. *Br. Med. J.* 1(5742):211-212, 1971.

4068 RESECTION WITH EXTERIORIZATION IN THE MANAGEMENT OF FAECAL FISTULAS ORIGINATING IN THE SMALL INTESTINE. (E.) Goligher, J. C. (Gen. Infirm., Leeds, England). *Br. J. Surg.* 58(3):163-167, 1971.

See also numbers: 3668, 3825, 3850, 3906, 4102, 4231, 4278

REGIONAL ENTERITIS

4069 LIVER DISEASE IN CROHN'S DISEASE. A STUDY OF 100 CONSECUTIVE PATIENTS. (E.) Eade, M. N. (Gen. Hosp., Birmingham, England), W. T. Cooke and J. A. Williams. *Scand. J. Gastroenterol.* 6(3):199-204, 1971.

Liver abnormalities (2/3 were more than minor) were extremely common in patients with Crohn's disease. The main abnormality was inflammatory change (71%), the earliest changes being observed in relation to portal veins. Concentric fibrosis around bile ducts, a classic feature of pericholangitis, was infrequently seen. Other histological abnormalities included hepatic granulomata and amyloidosis. No serum hepatitis, chronic active hepatitis or sclerosing cholangitis were observed. Clinical disease severity was directly related to serum albumin decreases and was reflected in an increased incidence of inflammatory cellular infiltration of the liver. Long duration of Crohn's disease was associated with an increased incidence of prolonged BSP retention. Extensive small intestine involvement with Crohn's disease was associated with elevated serum alkaline phosphatase and an increased incidence of hepatic fibrosis. Total colonic involvement with Crohn's disease apparently was a predisposing factor in the development of cirrhosis in patients with Crohn's disease.

4070 A ROENTGENOLOGIC SIGN OF REGIONAL ENTERITIS OF THE DUODENUM. (E.) Legge, D. A. (U. Minnesota Mayo Grad. Sch. Med., Rochester), H. C. Carlson and H. N. Hoffman, II. *Radiology* 100(1):37-39, 1971.

In 3 patients with regional enteritis of the duodenum, radiographic examination revealed narrowing of the second part of the duodenum and filling of the biliary and pancreatic ducts with barium. The ductal filling may have resulted from small fistulous tracts connecting the duodenal lumen with that of the ampulla, since fistulas occur frequently with regional enteritis; or the filling may be due to reflux through an ampulla damaged by adjacent inflammation. Pancreatitis observed in these cases was probably the result of passage of duodenal contents into the pancreatic ducts. Narrowing of the second part of the duodenum and ductal filling are highly suggestive of regional enteritis of the second portion of the duodenum, even if the patient has no symptoms of involvement of more distal parts of the intestine.

4071 PERIOSTITIS, ASEPTIC NECROSIS, AND ARTHRITIS OCCURING IN A PATIENT WITH CROHN'S DISEASE. (E.) Brom, B., S. Bank (Groote Schuur Hosp., Cape Town, South Africa), I. N. Marks and J. J. Cobb. *Gastroenterology* 60(6): 1106-1109, 1971.

A case of Crohn's disease of the small intestine accompanied by arthritis, periosteal changes and aseptic bone necrosis is presented. The patient had aseptic necrosis of both humeral heads and the lower end of the femur, osteochondritis of the right elbow joint, and periostitis of the bones around the knee joints. All of the features in the patient were unlike those which have been described with corticosteroid administration, leaving the possible association of bone lesions and Crohn's disease.

4072 ACUTE TERMINAL ILEITIS. CROHN'S DISEASE. (E.) Solheim, K. (Ulleval Hosp., Oslo, Norway). *J. Oslo City Hosp.* 21(1):3-9, 1971.

4073 TREATMENT OF CROHN'S DISEASE. (Nor.) Fausa, O. (Nat. Hosp., Oslo, Norway), E. Gjone, B. Klevmark and B. Fretheim. *Tidsskr. Nor. Laegeforen.* 91(7):509-11+526, 1971.

4074 SKELETAL ABNORMALITIES IN CROHN'S DISEASE. (E.) Wapnick, S. (U. Dept. Surg. Rhodesia, Salisbury). *S. Afr. Med. J.* 45(5):128-129, 1971.

4075 ROENTGEN-MORPHOLOGIC PARALLELS IN THE STUDY OF CROHN'S DISEASE. (Rus.) Shniger, N. U., L. L. Kapuller. *Klin. Med. (Mosk.)* 49(1):110-115, 1971.

4076 REGIONAL ENTEROCOLITIS (CROHN'S DISEASE). REPORT OF TWO CASES. (Bul.) Ganchev, G. R. *Khirurgiia (Sofiia)* 23(5):434-438, 1970.

See also numbers: 4044, 4214

MALABSORPTION

4077 INTESTINAL STRUCTURE AND FUNCTION IN MEGALOBLASTIC ANEMIA IN ADULTS. (E.) Saraya, A. K. (All-India Inst. Med. Sci., New Delhi), B. N. Tandon, K. Ramachandran and B. Saikia. *Am. J. Clin. Nutr.* 24(6):622-627, 1971.

Of 36 patients (24 males and 12 females, aged 12-60 yr) with megaloblastic anemia, 20 had marked vitamin B_{12} deficiency, 12 had folic acid deficiency, and 31 had hypoalbuminemia. D-Xylose malabsorption was present in 47.2%, negative fat balances in 61.1%, and positive Shilling's tests in 27.2%. Atrophy of the jejunal villi was present in 17 of 33 biopsied patients. An association was found between intestinal malabsorption and serum vitamin B_{12} levels and between abnormalities in the jejunal mucosa and protein deficiency. No association was found between malabsorption or mucosal abnormalities and serum folic acid and serum iron values. These findings suggest that vitamin B_{12} is responsible for bone marrow changes and protein deficiency causes morphological changes in the intestinal villi.

4078 RECURRENT ABDOMINAL PAIN DUE TO MILK AND LACTOSE INTOLERANCE IN SCHOOL-AGED CHILDREN. (E.) Bayless, T. M. (Johns Hopkins Hosp., Baltimore, Md.) and S.-S. Huang. *Pediatrics* 47(6):1029-1032, 1971.

Five children, 6 to 13 years old, complained of frequent episode of abdominal discomfort for more than 6 months. Physical, extensive laboratory and X-ray studies failed to reveal a cause for pain in these otherwise healthy children. There was no history of milk allergy or feeding problems as these 5 children were able to drink milk during infancy and early childhood without ill effect. However, lactose tolerance tests produced definite complaints of cramping abdominal pain and bloating in all 5 children, 1-2.5 hr after ingestion of the sugar. Low blood sugar rises with lactose, combined with the production of symptoms by the lactose tests, but not by glucose and galactose, indicated that digestion of lactose by intestinal lactase was inadequate. All five children became and have remained asymptomatic for 7 to 25 months following a decrease in their intake of lactose-containing foods.

4079 PRIMARY HYPOGAMMAGLOBULINEMIA AND MALABSORPTION. (E.) Hughes, W. S. (U. Pennsylvania Hosp., Philadelphia), J. J. Cerda, P. Holtzapple and F. P. Brooks. *Ann. Intern. Med.* 74(6):903-910, 1971.

In all six cases complaints of diarrhea, steatorrhea, or both, were intermittent and generally associated with increased severity of sinopulmonary symptoms. All patients showed intestinal nodular lymphoid hyperplasia. Malabsorption appeared to be best related to intestinal mucosal change, particularly villus atrophy, which was more pronounced in the patients with steatorrhea. Decreased D-xylose excretion, a low serum vitamin E level, and increased excretion of 5-HIAA in the urine correlated with steatorrhea. These laboratory findings, in the absence of a serotonin-producing tumor, support the concept of an intestinal mucosal abnormality as the cause of malabsorption. An infectious etiology was favored for the intestinal mucosal changes observed. The mainstay of therapy is prophylactic gammaglobulin injections, supplemented by antibiotics.

4080 RECOVERY OF SMALL-INTESTINAL STRUCTURE AND FUNCTION AFTER RESIDENCE IN THE TROPICS. II. STUDIES IN INDIANS AND PAKISTANIS LIVING IN NEW YORK CITY. (E.) Gerson, C. D. (Columbia U. Coll. Physicians and Surg., New York, N. Y.), T. H. Kent, J. R. Saha, N. Siddiqi and J. Lindenbaum. *Ann. Intern. Med.* 75(1):41-48, 1971.

Abnormalities of small intestinal structure and function common in asymptomatic native-born individuals living in India and Pakistan were ultimately reversible. Serial studies of absorptive function in those whose xylose excretion was initially subnormal showed improvement with time of residence in the United States, and without therapy in most cases. These Indo-Pakistani subjects recovered absorptive function despite the continued ingestion of curried foods, and their intestinal abnormalities were not associated with ova or parasites in the stool or increased urinary indican excretion. High serum cholesterol and hypertriglyceridemia were found only in those subjects with normal absorption, but, serum triglyceride levels rose in all of 12 serially studied subjects whose carbohydrate metabolism increased more than 1.0 g with time.

4081 INTESTINAL MICROFLORA. (E.) Gorbach, S. L. (Cook County Hosp., Chicago, Ill.). *Gastroenterology* 60(6):1110-1129, 1971.

The techniques for determining the presence of abnormal flora and the effects of this flora on small and large intestinal function are reviewed. Bacterial overgrowth of the small intestine as a possible cause of intestinal physiological malfunction is discussed. The nutritional status of the host and the intestinal microflora is an important relationship in tropical sprue. The intestinal microflora is radically altered during an episode of acute diarrhea, and in the feces, the pathogen is present in very high numbers, often eclipsing the normal flora. Pathogenic bacteria can cause acute diarrhea by: 1) the elaboration of a toxin, 2) direct penetration of the epithelium, or 3) direct mucosal injury associated with alterations in fluid transport. The relationship between tropical sprue and acute diarrhea is discussed. Culture of small intestine contents can provide the critical information in a patient with suspected bacterial contamination of the intestine. Intubation of the duodenum and upper jejunum has become a routine procedure for investigating pancreatic disease, biliary tract disease and malabsorption syndromes. Criteria are outlined for making a reasonable judgment on host-flora interaction and the necessity for antimicrobial therapy. (236 references)

4082 INTESTINAL ABSORPTION IN THE 'CONTAMINATED SMALL-BOWEL SYNDROME'. (E.) Gracey, M. (Princess Margaret Hosp. Child., Perth, Australia). *Gut* 12(5):403-410, 1971.

Malabsorption of fat is a common and important clinical feature in patients with bacterial contamination of the small intestine. An apparent relationship between intestinal bacteria and altered carbohydrate (xylose) absorption is indirect and probably mediated by other factors. Hypoproteinemia frequently occurs in the contaminated small bowel syndrome and may be severe enough to produce a clinical picture resembling protein-calorie malnutrition, but its cause is not absolutely established. Pernicious anemia, due to malabsorption of vitamin B_{12}, was the first systemic abnormality to be recognized in patients with intestinal stasis and macrocytic anemia often occurs in this situation. Folic acid, vitamin D and iron deficiency appear to be rare accompaniments of the contaminated small bowel syndrome. Serious disturbances in bile salt metabolism occur in this syndrome; the effects of these disturbances may lead to impaired water and electrolyte absorption.

4083 COELIAC DISEASE AND MALIGNANCY. THE POSSIBLE IMPORTANCE OF FAMILIAL INVOLVEMENT. (E.) Barry, R. E. (Bristol Roy. Infirm., England), J. S. Morris, S. Kenwright and A. E. Read. *Scand. J. Gastroenterol.* 6(3):205-207, 1971.

Two families are described in which the relatives of a known patient with proven celiac disease developed confirmed histological symptoms of the disease. Each subsequently developed a small intestine neoplasm. In the third family described, there was no way of proving a diagnosis of preexisting celiac disease in the proband's brother. However, he had intestinal symptoms identical with those of his sister and suggestive of steatorrhea since childhood, and he died from a primary abdominal Hodgkin's disease, the commonest malignancy to complicate celiac disease. There apparently is a greatly increased incidence of small intestinal malignancy in those instances in which the disease is familial. The genetic factor may be an abnormality of immune response which is manifest both as the disease and the tumor. Withdrawal of gluten from the diet may protect against the development of malignancy in celiac disease.

4084 CLINICAL APPLICATION OF A BANANA AND SKIMMED MILK DIET FOR INFANTS. (Ger.) Nachtigall, C. (City Hosp., Saarbrucken, Germany). *Aerztl. Prax.* 23(38):2187-2188, 1971.

4085 TREATMENT OF BACTERIAL DIGESTIVE INSUFFICIENCY BY BIOLOGICAL READJUSTMENT OF THE INTESTINAL FLORA. (Ger.) Cohrs, G. W. *Z. Allgemeinmed.* 46(36):1800-1805, 1970.

4086 PROTEIN AND CALORIE DEFICIENCY AND THE SMALL INTESTINE. (Cz.) Skala, I. (Lidu Res. Inst., Prague), O. Mareckova and J. Pechar. *Cesk. Gastroenterol. Vyz.* 25(1):11, 1971.

4087 MAGNESIUM DEFICIENCY IN CHILDREN PAST THE NEONATAL PERIOD. (Fr.) Salet, J. (Trousseau Hosp., Paris) and J. P. Fournet. *Sem. Hop. Paris* 47(1):39-45, 1971.

4088 INFLUENCE OF MALNUTRITION AND ALCOHOL ON THIAMINE ABSORPTION. (E.) *Nutr. Rev.* 29(1):13-15, 1971.

4089 CHRONIC DIARRHEA CAUSED BY DOMESTIC GIARDIASIS. (Sw.) Pettersson, T. (Univ. Cent. Hosp., Helsingfors, Finland) and O. Seiroos. *Nord. Med.* 85(3):78-80, 1971.

4090 DEVELOPMENT OF MALIGNANT LYMPHOMA DURING THE COURSE OF ADULT CELIAC DISEASE. (E.) Ansari, A. (Minneapolis VA Hosp., Minn.) and S. E. Silvis. *Am. J. Gastroenterol.* 55(5):482-488, 1971.

4091 DIAGNOSIS OF MALABSORPTION OF MONOSACCHARIDES AND DISACCHARIDES. PLANIMETRIC EVALUATION OF BLOOD SUGAR CURVES. (Ger.) Gravinghoff, J. (Martin Luther Pediatr. Clin., Halle Wittenberg, Germany). *Dtsch. Gesundheitsw.* 26(19):883-886, 1971.

4092 LACTOSE TOLERANCE TESTS AND MEDICAL VAGOTOMY. (Sp.) Freytes, M. A. (San Roque Hosp., Cordoba, Spain), H. Possetto, E. Rebora and O. Ballester. *Rev. Esp. Enferm. Apar. Dig.* 34(4):395-398, 1971.

4093 TOWARD A PHYSIOLOGICAL X-RAY DIAGNOSIS (V). RADIOLOGICAL ASPECTS OF THE DIGESTION OF FATTY FOODSTUFFS. (Fr.) Buffetaut, M. *J. Radiol. Electrol. Med. Nucl.* 52(1-2):122-125, 1971.

4094 DISORDERS OF FAT ABSORPTION AFTER VAGOTOMY ASSOCIATED WITH GASTROJEJUNOSTOMY. (Fr.) Grenier, J. F. (Civil Hosp., Strasbourg, France), G. Sava, D. Jaeck and M. Ohresser. *Acta Chir. Belg.* 69(3):170-180, 1970.

4095 LACTOSE INTOLERANCE IN SURINAM. (E.) Luyken, R. (TNO Cent. Inst. Nutr. Food Res., Zeist, Netherlands), F. W. M. Luyken Koning and M. J. T. Immikhuizen. *Trop. Geogr. Med.* 23(1):54-58, 1971.

4096 RECURRENT PLEURAL EFFUSION, PROTEIN LOSING ENTEROPATHY, MALABSORPTION, AND MOSAIC WARTS ASSOCIATED WITH GENERALIZED LYMPHATIC HYPOPLASIA. (E.) Ross, J. D. (City Hosp., Edinburgh, Scotland), K. D. G. Reid, and V. P. Ambujakshan. *Thorax* 26(1):119-124, 1971.

4097 GASTROINTESTINAL ALLERGY IN CHILDREN. (Fr.) Planes, M. (Hosp. Dis. Infant., Paris). *Rev. Pediatr.* 6(10):711-719, 1970.

4098 GLUTEN SENSITIVE ENTEROPATHY. CHARACTERISTICS IN CHILEAN CHILDREN. (Sp.) Danus, O. V. (Roberto del Rio Hosp., Santiago, Chile), B. J. Chuaqui, M. R. Ubbina and G. C. Solimano. *Pediatria (Santiago)* 13(1-2):45-50, 1970.

4099 LACTOSE INTOLERANCE IN ACUTE DIARRHEA IN INFANTS. (Sp.) Danus, O. (Roberto del Rio Hosp., Santiago, Chile), A. M. Urbina and H. Soriano. *Pediatria (Santiago)* 13(1-2): 51-57, 1970.

4100 A CASE OF TROPICAL SPRUE. (Sp.) Gonzalez Licea, A. (Natl. Med. Ctr. Gen. Hosp., Mexico City, Mexico) and L. Landa. *Arch. Invest. Med.* 1(1):79-82, 1970.

4101 CLINICAL AND PHYSIOLOGIC ASPECTS OF MEDIUM CHAIN TRIGLYCERIDES: ALLEVIATION OF STEATORRHEA IN PREMATURE INFANTS. (E.) Tantibhedhyangkul, P. (St. Luke's Hosp. Ctr., New York, N. Y.) and S. A. Hashim. *Bull NY Acad. Med.* 47(1):17-33, 1971.

See also numbers: 3909

4102 THE SPECTRUM OF ROENTGEN APPEARANCE IN AMYLOIDOSIS OF THE SMALL AND LARGE BOWEL: RADIOLOGIC-PATHOLOGIC CORRELATION. (E.) Seliger, G. (New York U. Med. Ctr., N. Y.), R. L. Krassner, E. R. Beranbaum and F. Miller. *Radiology* 100(1):63-70, 1971.

In all 13 cases studied, vascular amyloid deposition was primarily responsible for thickened or effaced valvulae conniventes seen in small intestinal studies, more so than mucosal involvement. The mucosal architecture usually remained well preserved, although on microscopic examination there was occasional blunting and widening of villi secondary to amyloid deposition. Three patients had clinical and laboratory evidence of malabsorption with diarrhea and protein-losing enteropathy, but their small intestine studies did not demonstrate segmentation or flocculation. The radiographic changes in amyloidosis of the small intestine are nonspecific and may be simulated by any process which produces thickening or effacement of the valvulae conniventes. These entities include Whipple's disease, intestinal lymphangiectasis, lymphosarcoma and intestinal edema. The roentgen findings of colonic amyloidosis are similar to those of ulcerative and granulomatous colitis, schistosomiasis, and ischemic colitis.

4103 FOLLOW-UP STUDY OF PATIENTS WITH COLOSTOMIES. (E.) Pryse-Phillips, W. (Queen's U. Dept. Neurol., Kingston, Ontario, Canada). *Am. J. Surg.* 122(1):27-32, 1971.

Psychologic effects in patients who have had a colostomy or ileostomy for at least 18 months were examined. Eleven of 20 patients, mean age 64.7 years, were rated as having some detrimental psychologic symptoms after the operation. Initial reactions to the colostomy, which were nearly universal, were transient depression, anxiety or embarrassment. Six patients were moderately or severely incapacitated, not by the physical presence of the colostomy, but by a morbid fear that some property (invariably taken to be a smell) of the colostomy would lead to its detection by others. These six patients were significantly more depressed and their symptoms mainly consisted of excessive attention to the stoma, protracted washing and cleanliness routines designed to remove any supposed odor, and a variably severe withdrawal from social activities. Treatment of such psychologic symptoms might best be with tricyclic antidepressive drugs.

4104 EFFECTIVE AND SAFE CONTROL OF INCONTINENCE BY THE INTRA-ANAL PLUG ELECTRODE. (E.) Glen, E. S. (Victoria Infirm., Glasgow, Scotland). *Br. J. Surg.* 58(4):249-252, 1971.

A regimen was described for treatment of urinary and fecal incontinence by the intra-anal plug electrode, giving good results in 30 patients. When correctly chosen for size, the plug will remain in position by virtue of its shape, if there is any tone in the anal canal at all. Most patients can use the stimulator for prolonged periods without discomfort, although some find it difficult to sleep with the current on. Modes of action include facilitation of a patient's awareness of perineal sensation. The plug helps the patient to localize the appropriate muscles. Stimulation of at least some of the components of the levator ani may occur when using an intra-anal plug electrode, and may be sufficient to restore continence.

4105 COLOSTOMY ENEMA. DESCRIPTION OF A CATHETER-NIPPLE DEVICE. (E.) Land, R. E. *Radiology* 100(1):36, 1971.

In order to prevent leakage of contrast material at the stoma during a barium enema examination in a patient with a colostomy, a catheter-nipple device was recommended. This assembly may be fabricated by cutting off the tip of an infant feeding nipple and inserting a soft rubber catheter through the enlarged hole. The tube and nipple are lubricated and placed within the colostomy stoma. The patient places his fingers on the flat edge of the nipple and presses it firmly against the stoma during administration of the enema. The device may also be used for cleansing irrigations.

4106 VOLUME AND COMPOSITION OF HUMAN INTESTINAL GAS DETERMINED BY MEANS OF AN INTESTINAL WASHOUT TECHNIC. (E.) Levitt, M. D. (U. Minnesota Hosp., Minneapolis). *N. Engl. J. Med.* 284(25):1394-1398, 1971.

Following an intestinal washout technique (argon infusion), the total volume of gas in 11 healthy subjects was relatively small, ranging from 30-200 ml. The composition of the gas was highly variable, nitrogen being predominant. The intestine was somewhat anaerobic as oxygen was present in concentrations below 2%. Carbon dioxide, hydrogen and methane made up more than 50% of the intestinal gas of 3 of 11 subjects. Since the atmospheric concentration of these gases is negligible, most of the intestinal gas resulted from intraluminal production rather than swallowed air. Intestinal bacteria directly influence the composition of intestinal gas through their utilization of oxygen and production of carbon dioxide, methane and hydrogen, and indirectly influence its composition by lowering luminal PN_2 which prevents absorption of swallowed N_2 and causes N_2 to diffuse into the lumen.

4107 HORMONAL FACTORS STIMULATING THE MOTILITY OF THE INTESTINAL TRACT IN INFLAMMATION OF ITS WALL. (E.) Zeitlin, I. J. (Western Gen. Hosp., Edinburgh, Scotland) and A. N. Smith. *Am. J. Dig. Dis.* 16(6):553-555, 1971.

The effect of various hormones on intestinal motility during inflammation of its wall was studied using tissue taken at operation from patients with colitis and diverticular disease. Acetylcholine, 5-hydroxytryptamine (5-HT), histamine and bradykinin all elicited contraction of colonic longitudinal muscle strips from patients with intestinal inflammation. However, muscle taken from the diseased tissue showed a marked insensitivity to 5-HT compared with tissue from the adjacent more normal areas. Response to the other drugs were identical in both areas. Kininogen levels were significantly elevated in distended muscle when compared with relatively normal tissue adjacent to the inflamed intestine.

4108 EVANESCENT COLITIS IN THE YOUNG ADULT: A NEW ENTITY? (E.) Miller, W. T. (U. Pennsylvania Hosp., Philadelphia), D. W. De Poto, H. W. Scholl and E. C. Raffensperger. *Radiology* 100(1):71-78, 1971.

The five patients presented differ from patients with ulcerative, granulomatous, and ischemic colitis. None of the 5 had prior gastrointestinal complaints or pertinent medical history before the acute onset of symptoms of abdominal pain and diarrhea. Three of the 5 had bloody bowel movements and all patients were younger than 42 years of age. Radiographic findings included segmental involvement with evidence of spasm, thumbprinting and/or multiple areas of ulceration. There was a rapid regression of symptoms without therapy. These cases may represent an unusual clinical manifestation of ischemia in the colon of a younger patient. The disease entity was termed evanescent colitis.

4109 GANGLIONEUROMATOSIS OF THE SIGMOID COLON. (E.) Munro, K. M. H. (Western Infirm., Glasgow, Scotland). *Br. J. Surg.* 58(5): 350-352, 1971.

A 72-yr-old male was admitted with an increasing degree of constipation for 9 months. Repeated barium enema examinations consistently showed a small stenosing lesion at about the mid point of the pelvic colon, the appearances simulating carcinoma or diverticulitis. No dilatation was seen proximally. At laparotomy, the only abnormal finding was a narrowed segment of sigmoid colon with several slightly bulging areas (10 mm in diameter) on the serosal surface. Following resection, histological examination revealed that areas of localized thickening were composed of bundles of nerve fibers and sometimes also of many ganglion cells, interlaced with much fibrous tissue and a small amount of smooth muscle. Between hypertrophied layers of the muscularis externa, the numbers of ganglion cells and nerve fibers of Auerbach's plexus were greater than in a normal colon. The biopsy was reported as ganglioneuromatosis of the sigmoid colon.

4110 PREPARATION OF THE INTESTINE IN PATIENTS UNDERGOING MAJOR LARGE-BOWEL SURGERY, MAINLY FOR NEOPLASMS OF THE COLON AND RECTUM. (E.) Rosenberg, I. L. (Gen. Infirm., Leeds, England), N. G. Graham, F. T. de Dombal and J. C. Goligher. *Br. J. Surg.* 58(4):269-271, 1971.

The combination of neomycin and phthalylsulfathiazole had no advantage over sulfonamide alone used in preparation for the intestine for major large intestine surgery. However, a combination of mechanical and antiseptic preparation was a more effective means of preparation than mechanical means alone. At operation, gross fecal loading of the intestine and peritoneal contamination were associated with a higher incidence of septic complications. All cases undergoing major large intestine surgery should have a thorough mechanical preparation to ensure an empty bowel at operation, an intestinal antiseptic in the preoperative period, and an operative technique which avoids peritoneal contamination.

4111 MESENTERIC CYST ASSOCIATED WITH PROTEIN LOSS IN THE GASTROINTESTINAL TRACT. STUDY WITH LYMPHANGIOGRAPHY. (E.) Leonidas, J. C. (Mt. Sinai Sch. Med., New York, N. Y.), F. B. Kopel and C. A. Danese. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):150-154, 1971.

A case of a child with a large cystic lymphangioma of the transverse mesocolon and mesentery associated with protein-losing enteropathy and hypoproteinemic edema was reported. A large abdominal mass was demonstrated by barium meal examination and confirmed at operation. Lymphangiography through the lower extremities showed reflux into the mesenteric cyst in the absence of anatomic obstruction of flow. Direct injection of iodized oil into the cyst showed full communication between the cyst and the thoracic duct. The association of a mesenteric cyst with protein-losing enteropathy may be considered as part of the spectrum of the lymphatic abnormalities of intestinal lymphangiectasia. This case suggests that lymphatic obstruction may not be the pathogenetic mechanism of congenital mesenteric cysts.

4112 ROENTGEN APPEARANCE OF THE EXCLUDED COLON AFTER COLESTOMY FOR INFANTILE HIRSCHSPRUNG'S DISEASE. (E.) Leonidas, J. C. (Mt. Sinai Sch. Med., New York, N. Y.), I. H. Krasna, L. Strauss, J. M. Becker and K. M. Schneider. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1): 116-122, 1971.

he preoperative barium enema examination showed ither a transition zone or delayed evacuation r both in 5 of 9 patients with Hirschsprung's isease. It was normal in 3 patients in whom the iagnosis was established in the neonatal period. n all patients, barium enema examinations, perormed after abdominoperineal pullthrough proedures, demonstrated rigidity and poor distenibility of the large intestine distal to the olostomy. In 7 cases, a ragged irregular conour of the colon was noted and there were thick nterlacing and redundant mucosal folds on relief. n microscopic examination, the mucosa formed olypoid folds and there was significant lymphoid yperplasia of the lamina propria with active erminal centers. The described changes are most ikely irreversible. Changes were probably a ombination of mucosal redundancy caused by ontraction of hypertrophic muscle and lymphoid issue proliferation related to nonspecific facors, such as infections and possible disuse.

113 SEGMENTAL DILATATION OF THE COLON. (E.) de Lorimier, A. A. (U. California Sch. ed., San Francisco), S. R. Benzian and C. A. ooding. *Am. J. Roentgenol. Radium Ther. Nucl. ed.* 112(1):100-104, 1971.

n a patient with segmental dilatation of the olon, an extremely long segment of colon, exending from the cecum to the descending colon, as involved. As in previously described patients, ne muscularis of the dilated bowel was hyperrophied and the bowel proximal and distal to ne dilated segment was normal. Normal neuroibrils and ganglion cells were noted throughout ne colon. Also the distal colon and rectum were istensible, and irregular, serrated contractions ere not seen. These findings together with the stablishment of normal ganglion cells and neuroibrils on rectal biopsy distinguish segmental ilatation from Hirschsprung's disease. The ilated segment should be resected as this abnoral segment is apparently the cause of constipaion. Since the symptoms of constipation and bdominal distention developed in early infancy, egmental dilatation may be a congenital anomaly.

114 NON-TRAUMATIC PERFORATIONS OF THE COLON. (E.) Havia, T. (U. Turku Dept. Surg., inland). *Acta Chir. Scand.* 137(4):375-379, 971.

erforation into the free peritoneal cavity was een in 22 patients, all of whom already had a iffuse peritonitis. Of 15 patients who had losed perforation, four-fifths had abdominal ain and one-fifth symptoms of intestinal obstruction. The sigmoid colon was the most frequent ite of either type perforation and diverticulitis as the most common cause of both types of perortation, although carcinoma was equally frequent in delimited perforations. Ten of 22 atients with free perforation died, exteriorization of the perforated loop being the surgical treatment of choice. Two of 13 surgically treated patients with closed perforation died. With respect to the treatment of perforative diverticulosis, there is a tendency towards more extensive primary surgical procedures like primary resection with or without anastomosis.

4115 DIVERTICULOSIS OF THE COLON. (E.) Havia, T. (U. Turku Dept. Surg., Finland). *Acta Chir. Scand.* 137(4):367-373, 1971.

Most patients with diverticulosis of the colon were over 60 (mean age 68). No pathognomonic symptoms or signs could be established. Associated diseases of the gastrointestinal tract, the commonest being gallstones and hiatal hernia, were established in 92 (31%) cases. Roentgenologic examination was the only diagnostic procedure, except for 12 diverticular perforations established at laparotomy. Irrigation or spasticity of the colon was demonstrated fluoroscopically in 70 patients, of whom 39% also had clinical diverticulitis. The sigmoid or the descending colon was affected in 98%, the sigmoid alone in only 50%. Complications of diverticulosis were encountered in 118 cases (40%) and included: uncomplicated diverticulitis, melena, free perforation and intestinal obstruction. Ten per cent of the complications necessitated surgical intervention for perforation or intestinal obstruction.

4116 CARCINOID TUMORS OF THE RECTUM. (E.) Orloff, M. J. (Univ. Hosp., San Diego, Calif.). *Cancer* 28(1):175-180, 1971.

Those arising in the rectum are the third most common of the gastrointestinal carcinoids making up about 17% of cases reported. The lesions usually appear on protosigmoidoscopy as a small movable, submucosal nodule with intact overlying epithelium. Of the 38 cases in this series, 39% were malignant and only one had an associated malignancy. Carcinoid tumors of the rectum constitute less than 1% of gastrointestinal neoplasms and occur usually in the sixth and seventh decades. The most common symptoms in the group were mild rectal bleeding due to ulceration of the tumor, and constipation. Twenty-three patients with carcinoids smaller than 2 cm in diameter survived more than 5 yr without recurrence. Thirteen patients with tumors 2 cm or larger had muscle invasion by tumor, and had a 40% 5-yr survival rate.

4117 COLONIC CHANGES SECONDARY TO STOMAL ULCER. (E.) Abbruzzese, A. A. (Harvard Med. Sch. Sch., Boston Mass.) and H. Griffiths. *Am. J. Gastroenterol.* 55(5):447-450, 1971.

Two patients with Billbroth II resections were explored for suspected carcinoma of the transverse colon because of colonic changes secondary to stomal ulcers. In the first patient, a stomal ulcer, fixed to the anterior wall of the splenic flexure was freed from the colon, resected and a new gastrojejunal anastomosis formed. In the second patient, a large inflammatory mass was found involving the gastrojejunostomy and transverse colon. This area was resected and further dissection of the operative specimen outlined an abscess cavity bounded by a portion of the transverse colon, stomach and jejunum. Findings described here are the forerunners of fistulous communication between stomach and colon. This disastrous complication can be avoided by bearing in mind the potential diagnostic value of a barium enema in suspected stomal ulcer disease, an iatrogenic disease and almost entirely a sequel of subtotal gastrectomies for duodenal ulcers.

4118 GEOGRAPHIC PATHOLOGY OF CANCER OF THE COLON AND RECTUM. (E.) Stewart, H. L. (NCI, Bethesda, Md.). *Cancer* 28(1):25-28, 1971.

The highest rates for cancer of the colon are found in the English-speaking countries of the world. Malignant change appears to diminish progressively with the distance from the ileocecal valve, until the sigmoid colon (frequent) is reached. Cancer of the rectum has lower incidence rates than cancer of the colon. In most countries, colonic cancer is slightly more common in females while rectal cancer is more common in males. There are apparently no racially determined differences. There are no satisfactory explanations for the observed low rates of cancer of the large intestine in the Negroes of sub-Saharan Africa. A close association, perhaps a relationship, has been suggested, in many comparative studies, between adenomatous polyps and bowel cancers. The etiology of cancers of different segments of the alimentary tract is highly specific, and, in all probability, the responsible conditions reside in the environment.

4119 MANAGEMENT OF MULTIPLE POLYPOSIS OF THE LARGE BOWEL. (E.) Moertel, C. G. (Mayo Clin., Rochester, Minn.), J. R. Hill and M. A. Adson. *Cancer* 28(1):160-164, 1971.

One hundred seventy-eight patients who had subtotal colectomy and ileorectosigmoidostomy for multiple polyps of the large bowel were followed. In 35 of these patients who had no rectal polyps, patients presented at a more advanced age and were usually male. The remaining patients, with diffuse polyps of the rectum, presented at a much younger age and had a positive family history. Of the latter larger group, 22% developed proven invasive rectal adenocarcinoma during the follow-up period. Most of these patients were female and the median age at diagnosis of rectal cancer was 48 years. The occurrence rate increased from 5% in patients followed up for 5 years to 51% in those followed for 23 years, despite frequent proctosigmoidoscopic surveillance. Colectomy with ileorectosigmoidostomy was inadequate treatment for multiple polyposis of the large intestine diffusely involving both colon and rectum.

4120 FAMILIAL FACTORS IN ADENOCARCINOMA OF THE COLON. (E.) Neel, J. V. (U. Michigan Med. Sch., Ann Arbor). *Cancer* 28(1):46-50, 1971.

A collection of genetic entities in which the end result is a familial tendency to adenocarcinoma, the malignancy developing on the basis of an inherited morphological abnormality, are presented. Classical multiple polyposis of the colon, inherited as a simple dominant trait, usually in the first or second decade is associated with a progressive proliferation of polyps. Another entity is the Gardner syndrome in which polyps of the gastrointestinal tract occur in association with a variety of tumors, but most notably osteomas, fibromas and sebaceous cysts. The Peutz-Jeghers syndrome, inherited as a simple dominant trait, has to be regarded as a potential basis for familial adenocarcinoma of the colon. Indiscrete discrete polyps of the colon and rectum is a term applied to a tendency observed in a single large kindred for many individuals to inhibit from 1 to 4 polyps on clinical examination. Familial tendency toward adenocarcinoma of the colon may vary from very high, when the disease develops on the basis of multiple polyposis, to rather low, in the non-cancer family.

4121 IDENTIFICATION OF ANTECEDENTS TO COLORECTAL CANCER. (E.) Burdette, W. J. (U. Texas M. D. Anderson Hosp., Houston). *Cancer* 28(1):51-59, 1971.

Morphologic criteria or karyotyping do not reveal useful information about the potential of colonic epithelium for neoplastic transformation. High risks for colorectal carcinoma are associated with diseases such as villous adenoma, ulcerative colitis, and Crohn's disease and exposure to nitrates and special diets. Several nonallelic, dominant, autosomal mutants lead to colonic adenocarcinoma in a high percentage of those who are heterozygotes, those occurring with highest frequency being multiple polyposis and Gardner's syndrome. Cross-reacting tumor antigens offer a means for identifying the presence of neoplasms at an early stage. Gradients for DNA, RNA, and protein synthesis are different when normal epithelium from base of crypt to surface and epithelium destined to become neoplastic, that adjacent to neoplastic tissue, and neoplasms themselves are compared. Susceptibility to transformation by carcinogens and mutagens may distinguish between preneoplastic and normal colorectal epithelium.

4122 ILEO-RECTAL ANASTOMOSIS FOR CROHN'S DISEASE OF THE COLON. (E.) Baker,

V. N. W. (St. Mark's Hosp., London). *Gut* 12(6): 427-431, 1971.

The effectiveness of ileorectal anastomosis in the treatment of Crohn's disease of the colon was assessed in 26 patients who underwent total colectomy and ileorectal anastomosis. Results were good in 5 cases, fair in 14, and poor in 7. Three patients died as a result of the operation and persistent Crohn's disease, two died from malignant diseases and one died some years after operation but the cause was unknown. The operative morbidity was low with only one major anastomotic leak leading to peritonitis and pelvic sepsis. Half of the patients developed recurrent disease at the anastomosis, usually within 18 months after surgery; however, only rarely was there recurrence in the small intestine. In most cases, recurrences were successfully treated medically and surgery was unnecessary. Five patients developed complicated anal fistulas up to 7 years following surgery. Although there was a lower operative morbidity associated with ileorectal anastomosis in the treatment of Crohn's disease than for ulcerative colitis, the development of recurrent disease and complicated anal lesions make the long-term prognosis worse.

4123 ISCHAEMIC COLITIS AND THE CONTRACEPTIVE PILL. (E.) Cotton, P. B. (St. Thomas's Hosp., London) and M. L. Thomas. *Br. Med. J.* 2(5765):27-28, 1971.

A case of ischemic colitis which occurred in a woman taking an oral contraceptive is presented and the possible causative relationship is discussed. The clinical course and radiological features in the patient were typical of ischemic colitis. The only unusual features were the patient's age (39) and sex. In view of the patient's age and sex, the absence of other precipitating factors, and the report by Kilpatrick of two patients aged 29 and 32 taking oral contraceptive pills who showed radiological evidence of transient ischemic colitis, an etiologic relationship may be present.

4124 BETAMETHASONE 17-VALERATE AND PREDNISOLONE 21-PHOSPHATE RETENTION ENEMATA IN PROCTOCOLITIS. A MULTICENTRE TRIAL. (E.) Jones, J. H. (St. Marks Hosp., London), J. E. Lennard-Jones, J. J. Misiewicz, J. A. Parrish, M. Atkinson, A. M. Gill, A. T. Otaki, W. Sircus, R. Walker and G. Watkinson. *Br. Med. J.* 3(5766): 84-86, 1971.

Subjects consisted of outpatients suffering from an acute relapse or a first attack of idiopathic proctitis or left-sided ulcerative colitis. Subjects were either untreated for the 6 weeks before the trial or those who had relapsed while on sulfasalazine who had received no steroids for 6 weeks before the trial but continued on sulfasalazine during the trial. Patients were seen at 2 and 4 weeks during the 4-week period during which they took nightly self-administered enemas containing either 5 mg of betamethasone 17-valerate (38 untreated, 13 treated patients) or 20 mg of prednisolone disodium 21-phosphate (37 untreated, 17 treated patients). The effectiveness of the two steroid enema preparations in the treatment of left-sided proctocolitis was similar. Of those treated with prednisolone alone, 17 of 34 (50%) went into remission, compared to 9 of 15 (60%) who were being treated with sulfasalazine concurrently. Of those treated with betamethasone alone, 18 of 36 (50%) went into remission compared with 10 of 12 (83%) who received sulfasalizine in addition. Fewer patients were in remission at 2 than at 4 weeks. Side effects were complained of by 7 taking betamethasone (backache, leg cramps, malaise, indigestion, nausea, pain on defecation and skin rash) and 6 taking prednisolone (abdominal discomfort, depression, malaise, and perianal irritation), but none felt it necessary to discontinue the enemas. None developed moon facies or acne. There was no difference in mean plasma cortisol level in both groups before therapy, while both groups showed a significant fall in these levels at 2 weeks, without any further significant fall at 4 weeks. Both 2 and 4 week levels with prednisolone were significantly lower than with betamethasone. There was no apparent correlation between the percentage fall of plasma cortisol and the clinical response to treatment.

4125 SURGICAL MANAGEMENT OF PERIDIVERTICULITIS OF THE COLON. (E.) Bacon, H. E. (Philadelphia, Pa.) and K. Shindo. *Surg. Gynecol. Obstet.* 132(6):1049-1050, 1971.

In this retrospective study of 633 patients with diverticulitis from 1940-1970, 322 underwent definitive resection. Emergency surgery was performed in 62 cases with 4 deaths (6.4% mortality). Of the 322 patients resected, 69 underwent staged operations totaling 162 procedures, and there was one death in this group. Of the 253 who underwent primary resection, 2 died (0.8%), and the mean hospitalization period was 10-13 days, with a rapid return to work. There were 28 instances of sigmoidovesical (23), sigmoidouterovesical (3) or sigmoidouterine (2) fistulae. Enterocolic fistulae were seen in 21, sigmoidovaginal fistulae in 7. Adenomatous polyps were found in 51 patients (15.6%) and adenocarcinoma of the resected specimen in 24 (7.3%). In most, the iliac and pelvic portions of the sigmoid colon were removed (mean length of 27 cm) with anastomosis of the descendong colon to the mobilized summit of the rectum. Hemicolectomy was performed in 47, total colectomy in 7; hospitalization was prolonged to 14-21 days after hemicolectomy. In the 322 subjected to primary resection, leakage at the anastomotic site occurred in 7 (2.2%).

4126 SIGMOID VOLVULUS. AN EXAMINATION OF THE MORTALITY. (E.) String, S. T. (Case West. Reserve U. Sch. Med., Cleveland, Ohio) and J. J. Decosse. *Am. J. Surg.* 121(3):293-297, 1971.

4127 ADENOCARCINOMA OF THE COLON. REVIEW OF 175 CASES. (E.) Syrquin, A. F. (St. Louis County Hosp., Clayton, Mo.) and M. Wood. *Ariz. Med.* 28(1):22-25, 1971.

4128 BENIGN STRICTURE OF COLON MIMICKING RECURRENCE OF TUMOUR. (E.) Kirkham, J. S. (St. James's Hosp., London). *Proc. Roy. Soc. Med.* 64(1):38-39, 1971.

4129 TOXIC MEGACOLON. (E.) Beal, J. M. *Ill. Med. J.* 139(1):41-46, 1971.

4130 ACUTE APPENDICITIS IN YOUNG CHILDREN. (Jap.) Orihata, H. (Tokyo Women's Med. Coll.), Y. Ohta and J. Yamanaka. *Tokyo Joshi Ikadaigaku Zasshi (J. Tokyo Wom. Med. Coll.)* 40(11):752-759, 1970.

4131 THROMBO-EMBOLIC DISEASE CAUSED BY CLINICALLY SILENT ENDOAPPENDICITIS. (Fr.) Germain, P. (Civil Hosp., Reims, France), T. Caulet and P. Girard. *J. Med. Chir. Prat.* 142(2):56-60, 1971.

4132 TREATMENT OF CONSTIPATION. (Fr.) Guerre, J. *Gaz. Med. Fr.* 78(10):1567-1571, 1971.

4133 ACUTE APPENDICITIS COMPLICATED BY STRANGULATING INTESTINAL OBSTRUCTION IN A CASE OF GASTRIC CANCER. (Rus.) Kotelnikov, V. V. *Klin. Khir.* 51(1):75-76, 1971.

4134 TREATMENT OF INTESTINAL INFECTIONS WITH THE BACILLIS STRAIN I.P. 5832. (Fr.) Pillen, D. *Med. Prat.* 27(427):65-68, 1971.

4135 AMPUTATION OF THE RECTUM COMPARED WITH BABCOCK'S OPERATION. (Fr.) Mouchet, A. and F. Dubois. *Presse Med.* 79(1):11-13, 1971.

4136 DIFFUSE HEMANGIOMATOSIS OF THE COLON AND RECTUM. (Pol.) Reiss, H. (1st Gen. Hosp., Bydgoszcz, Poland) and K. Ryc. *Pol. Przegl. Chir.* 43(1):115-118, 1971.

4137 TREATMENT OF RECTAL PROLAPSE. (Sp.) Strescobich, D. (Israelita Hosp., Buenos Aires, Argentina). *Bol. Soc. Argent. Cir.* 31(24):591-601, 1970.

4138 ABDOMINAL EMERGENCIES OF COLORECTAL ORIGIN. (Sp.) Anonymous. *Bol. Soc. Argent. Cir.* 31(21):513-536, 1970.

4139 ACUTE APPENDICITIS: 25 YEARS EXPERIENCE IN THE SPANISH HOSPITAL. (Sp.) Matute Vidal, A. (Hosp. Espanol, Mexico City, Mexico), C. Fernandez Cabal, A. Monroy Quintanar and A. Matute, Jr. *Cir. Cir.* 38(2):111-146, 1970.

4140 A RARE COMPLICATION OF APPENDECTOMY: INJURY TO THE RIGHT EXTERNAL ILIAC ARTERY AND VEIN. (Fr.) De Parades, B. *Bull. Soc. Chir. Paris* 60(4):245-251, 1970.

4141 SOLITARY NONSPECIFIC ULCER OF THE CECUM. (Heb.) Zer, M. (Beilinson Hosp., Petah Tikva, Israel), M. Lurie, A. Viess and M. Dintsman. *Harefuah* 79(8):355-357, 1970.

4142 ACUTE APPENDIX INTUSSUSCEPTION. A CASE REPORT. (E.) Sukhupragarn, S. (Chiengmai U. Sch. Med., Thailand). *J. Med. Assoc. Thai.* 57(1):53-57, 1970.

4143 RECTAL PROLAPSE IN THE CHILD. (Ger.) Herzog, B. (Kind. Hosp., Basel, Switzerland). *Helv. Chir. Acta* 37(6):575-581, 1970.

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See also numbers: 3680, 3834, 3846, 3847, 3863, 4016, 4021, 4069

4203 GENETIC IMPLICATIONS IN ULCERATIVE COLITIS. (E.) Sanford, G. E. (Spokane, Wash.). *Am. Surg.* 37(8):512-517, 1971.

The literature is reviewed and a seventh case of ulcerative colitis in a pair of monozygous twins is reported. The first twin developed pain and diarrhea at 19 yr, and at 21 yr he underwent total colectomy with good results until 26 when he developed intestinal obstruction due to volvulus. The second was well until 21 yr when he developed abdominal pain and diarrhea, was treated medically for 6 months and then underwent total colectomy. The latter had a complete obstruction due to volvulus at 27. Each had 1 more episode of intestinal obstruction and each developed an ileocutaneous fistula adjacent to the ileostomy. At 32 yr of age both developed duodenal ulcers with repeated hemorrhages, while 1 yr later both had massive hemorrhages and underwent vagotomy and pyloroplasty. The occurrence of ulcerative colitis in monozygotic twins and the fact that it has never been reported in 1 twin and not in the other is significant evidence of a hereditary factor.

4204 RELIABILITY OF PHYSICAL SIGNS IN PATIENTS WITH SEVERE ATTACKS OF ULCERATIVE COLITIS. (E.) Graham, N. G. (Roy. Infirm., Huddersfield, England), F. T. de Dombal and J. C. Goligher. *Br. Med. J.* 2(2764):746-748, 1971.

The reliability of physical signs in patients with severe acute ulcerative colitis were studied by having three independent observers assess the physical signs and clinical progress of 8 patients. In every instance the degree of agreement was at least twice that expected by chance, while the observed percentage of disagreement was less than one-third of the expected figure. The presence or absence of tenderness, rebound tenderness, and distention of the abdomen, together with the severity of tenderness were reliably recorded by the 3 observers. There was also a large measure of agreement concerning the overall status and recommendations for treatment. Observer agreement was less satisfactory regarding findings on percussion of the abdomen, assessment of the patient's overall progress, the patients' paleness, anemia, and dehydration, as well as abdominal rigidity.

4205 CANCER AND ULCERATIVE COLITIS. (E.) Aylett, S. (Gordon Hosp., London). *Br. Med. J.* 2(5755):203-205, 1971.

A review of those cases of ulcerative colitis in a personal series in which carcinoma developed in the residual rectal stump after total colectomy and ileorectal anastomosis is presented. Of 369 patients on whom surgery was performed, there were 19 operative deaths, and of the 350 survivors 7 developed cancer (2%). Five of the 7 patients had been ill for periods varying between 12 and 18 yr. Twenty-two patients who had been under prolonged medical care were presented for surgery but all had widely disseminated cancer rendering cure impossible. Of these patients, 18 had had ulcerative colitis over 10 yr, with 5 having it since childhood and 10 since early adult life. Medical treatment is seemingly essential in the treatment of ulcerative colitis, and if the suggested precautions are taken the risk of incurable cancer developing unrecognized seems to be slight.

4206 URIC ACID CALCULI ASSOCIATED WITH ILEOSTOMY FOR ULCERATIVE COLITIS. (E.) Gigax, J. H. (Wilford Hall US Air Force Med. Ctr., Lackland Air Force Base, Tex.) and J. R. Leach. *J. Urol.* 105(6):797-799, 1971.

Two brothers had ulcerative colitis that necessitated colectomy. Subsequently, uric acid calculi were noted. Persistently acid urine in relatively small volumes probably contributed most to the development of uric acid calculi in these patients. Other conditions which favor precipitation of crystalloid material include urinary stasis, infection and increased crystalloidal output. Ileostomy patients may be likely to have uric acid calculi since they are prone to systemic acidosis due to loss of alkaline fecal material and their kidneys secrete acid urine to compensate for metabolic acidosis. Then when dehydration sets in (common after ileostomy), a supersaturation of uric acid occurs. Alkalization and allopurinol would seem to be effective in the treatment of these patients.

4207 ULCERATIVE COLITIS IN CHILDREN UNDER ONE YEAR: A TWENTY-YEAR REVIEW. (E.) Ein, S. H. (U. Toronto Fac. Med., Canada), M. J. Lynch and C. A. Stephens. *J. Pediatr. Surg.* 6(3):264-271, 1971.

In a group of 8 infants, the disease was either mild, short-lasting and required little specific treatment, or it was severely acute and progressive, with half of the babies dying within a few months of the onset of illness. In 2 of 8 infants, the only sign and symptom of ulcerative colitis was bloody diarrhea. On sigmoidoscopy in all, the mucosa of the rectum and sigmoid was friable, edematous, and hyperemic, with a loss of the normal submucosal vascular pattern. The only extracolonic manifestation of ulcerative colitis was failure to thrive. Steroid therapy of all types was used in 5 patients with success in only 1 child. Two of four infants who received emergency subtotal colectomy and ileostomy are alive and in good health.

4208 AUTOIMMUNE HEMOLYTIC ANEMIA IN ULCERATIVE COLITIS, CURED BY COLECTOMY. REPORT OF

A CASE. (E.) Arrer, O. (Karolinska Hosp., Stockholm, Sweden), J. Brohult, L. Engstedt, R. Karlson and T. Sällström. *Acta Med. Scand.* 189(4):275-277, 1971.

A 42-yr-old woman had fulminant ulcerative colitis with very severe hemolytic anemia and a strongly positive direct Coomb's test. Following unsuccessful treatment with various antibiotics, betamethasone, ACTH and heparin, total colectomy with ileostomy was performed without complications. The patient's condition improved considerably as her hemoglobin concentration and reticulocyte number were normal and Coomb's test was negative. Among the complication of ulcerative colitis, in which autoantibodies seem to play a role, Coomb's positive hemolytic anemia is a rare but relatively well-defined example. In spite of the fact that the spleen was left in place in the above patients, the direct Coomb's reaction became negative after the colectomy.

4209 THE RELATIVE SIGNIFICANCE OF PREOPERATIVE ORAL ANTIBIOTICS, MECHANICAL BOWEL PREPARATION, AND PREOPERATIVE PERITONEAL CONTAMINATION IN THE AVOIDANCE OF SEPSIS AFTER RADICAL SURGERY FOR ULCERATIVE COLITIS AND CROHN'S DISEASE OF THE LARGE BOWEL. (E.) Barker, K. (Gen. Infirm., Leeds), N. G. Graham, M. C. Mason, F. T. de Dombal and J. C. Goligher. *Br. J. Surg.* 58(4):270-273, 1971.

Colomycin added to the standard preoperative regime of phthalylsulfanthiazole did not alter postoperative complication rates between the 2 groups of patients. There was a significant increase in the abdominal wound infection rate in patients with a loaded bowel at operation. Hence, adequate mechanical preparation is important in reducing the incidence of wound sepsis after colonic surgery. There was a significant rise in the incidence of paralytic ileus and abdominal wound infection associated with even slight contamination of the peritoneal cavity by feces. There were 6 deaths in this series due to staphylococcal enterocolitis, pulmonary embolus, peritonitis due to anastomotic leak and Gram-negative septicemia. Antibiotic sterilization of the large intestine, whatever its intrinsic merits, is no substitute for adequate mechanical preparation and meticulous attention to surgical technique.

4210 EXPERIMENTAL DIARRHEA. I. INTESTINAL WATER AND ELECTROLYTE TRANSPORT IN RAT SALMONELLA ENTEROCOLITIS. (E.) Powell, D. W., G. R. Plotkin, R. M. Maenza, L. I. Solberg, D. H. Catlin and S. B. Formal (Walter Reed Army Inst. Res., Washington, D. C.). *Gastroenterology* 60(6):1053-1064, 1971.

The intestinal transport of water and electrolytes was studied in rats with induced salmonella enterocolitis with and without diarrhea. Infected animals without diarrhea showed a decrease in ileal absorption and a reversal of ileal bicarbonate transport from secretion to absorption. Jejunal and large intestinal transport was similar in both infected groups. Ileal secretion of H_2O, Na, K and C_1, however, was apparent in the infected group with diarrhea but not in those without diarrhea. Ileal secretion seems to be a major physiological determinant of diarrhea in induced salmonella enterocolitis in the rat.

4211 EXPERIMENTAL DIARRHEA. II. GLUCOSE-STIMULATED SODIUM AND WATER TRANSPORT IN RAT SALMONELLA ENTEROCOLITIS. (E.) Powell, D. W., G. R. Plotkin, L. I. Solberg, D. H. Catlin, R. M. Maenza and S. B. Formal (Walter Reed Army Inst. Res., Washington, D. C.). *Gastroenterology* 60(6):1065-1075, 1971.

Intestinal net water and solute transport from a glucose-containing solution was determined in rats with induced salmonella enterocolitis. Administration of a 118 mM Na - 56 mM glucose solution elicited maximal jejunal and ileal transport rates in uninfected controls. Na and H_2O transport was significantly less than control values in the jejunum, ileum, and large intestine of the infected animals. Glucose increased H_2O absorption in the jejunum as well as the ileum of the infected animals, and the fluid secretion seen with the balanced electrolyte solution was also reduced to zero with the glucose solution. The absorptive mechanisms are apparently disrupted in rat salmonellosis, and glucose-stimulated water and sodium transport could only be demonstrated in half of the animals studied.

4212 EXPERIMENTAL DIARRHEA. III. BICARBONATE TRANSPORT IN RAT SALMONELLA ENTEROCOLITIS. (E.) Powell, D. W., L. I. Solberg, G. R. Plotkin, D. H. Catlin, R. M. Maenza and S. B. Formal (Walter Reed Army Inst. Res., Washington, D. C.). *Gastroenterology* 60(6):1076-1086, 1971.

Bicarbonate transport in the intestine of normal rats and rats infected with Salmonella typhimurium was studied and the changes in luminal pH and pCO_2 during intestinal transit were determined with HCO_3-free and HCO_3-containing solutions. Bicarbonate absorption was similar in normal and infected rats. Perfusion of a HCO_3-free solution did not cause an alteration in the pCO_2 of either normal or infected animals. However, the solution pH decreased and pCO_2 increased significantly in the normal jejunum and the infected ileum during perfusion with HCO_3-containing solutions. The mechanism of HCO_3 absorption in these segments is seemingly associated with H secretion.

4213 CHRONIC ULCERATIVE COLITIS, COLONIC ADENOCARCINOMA AND HYPOGLYCEMIA. (E.) Whang, R. (U. New Mexico Sch. Med., Albuquerque), G. M.

Boyden, E. B. Herring and H. S. Seltzer. *Am. J. Dig. Dis.* 16(1):45-50, 1971.

4214 METACHRONOUS DEVELOPMENT OF REGIONAL ENTERITIS OF THE COLON IN A PATIENT WITH ULCERATIVE COLITIS. (E.) Babb, R. R. (Med. Clin., Palo Alto, Calif.) and J. H. Kieraldo. *Calif. Med.* 114(3):80-84, 1971.

4215 A STUDY OF CYTOMORPHOLOGY IN THE DIAGNOSIS OF HEMORRHAGIC RECTOCOLITIS. (Fr.) Aran, J. (Santa Cruz y San Pablo Hosp., Barcelona, Spain) and V. Cabre. *Ann. Gastroenterol. Hepatol. (Paris)* 7(3):239-246, 1971.

4216 ULCERATIVE COLITIS, AUTOIMMUNE EPIPHENOMENA, AND COLONIC CANCER. (E.) Kronman, B. S. *Cancer* 28(1):82-88, 1971.

4217 THE ISOLATED POLYP IN ULCERATIVE COLITIS. (E.) Ruoff, M. (New York U. Sch. Med., N. Y.) and A. E. Lindner. *Am. J. Gastroenterol.* 55(5):471-476, 1971.

4218 ULCERATIVE COLITIS. EPIDEMIOLOGY AND AETIOLOGY, COURSE AND PROGNOSIS. (E.) De Dombal, F. T. (Gen. Infirm., Leeds, England). *Br. Med. J.* 1(5750):649-650, 1971.

See also numbers: 4124, 4269

PANCREAS

4219 TOTAL PANCREATECTOMY FOR DUCTAL CARCINOMA. (E.) Hicks, R. E. (Peter Bent Brigham Hosp., Boston, Mass.) and J. R. Brooks. *Surg. Gynecol. Obstet.* 133(1):16-20, 1971.

The upper gastrointestinal series with hypotonic duodenography was the most helpful diagnostic aid in revealing carcinoma of the pancreas. The operative mortality rate for those undergoing partial pancreatectomy was 18.2% while only 1 patient (9.1%) died following total pancreatectomy. Only one of 9 surviving patients with partial resections lived longer than 1 yr. Five of ten survivors of total pancreatectomy lived longer than one year. In the partial pancreatectomy group, four of the 11 patients, including 2 deaths, had complications directly related to the pancreatic anastomosis. Only one totally pancreatectomized patient had severe complications - myocardial infarction and pneumonia. The pathologic findings in both groups was ductal adenocarcinoma. A satisfactory early and late metabolic response was shown with the use of insulin, pancreatic extracts and dietary control in total pancreatectomized patients. The use of total pancreatectomy in patients with early pancreatic ductal carcinoma offers the best chance of cure.

4220 PSEUDOCYSTS OF THE PANCREAS PRESENTING AS RENAL MASS LESIONS. (E.) Kiviat, M. D. (U. Washington Dept. Urol., Seattle), E. V. Miller and J. S. Ansell. *Br. J. Urol.* 43(3): 257-262, 1971.

Pseudocysts of the pancreas presenting as renal mass lesions in 2 patients are described. Selective renal arteriography may and did serve to differentiate vascular from avascular lesions of the kidney. However, in the present cases extrinsic lesions causing gross deformity of the kidney was confused with masses of intrinsic origin despite adequate arteriographic studies. Surgical exploration revealed the true nature of the lesion, a thick-walled cystic mass which was filled with liquid decomposed blood. An emergency amylase determination was done on the cystic fluid and was found to be high, indicating that the cyst was of pancreatic origin. When psuedocysts of the pancreas are diagnosed, either resection of the involved pancreas should be performed, or provision made for adequate and prolonged drainage of the consequent pancreatic fistula.

4221 PANCREAS ANNULARE. (Nor.) Ilebekk, A. (Aker Hosp., Oslo, Norway). *Tidsskr. Nor. Laegeforen.* 91(4):278-79 & 296, 1971.

4222 FAILURE OF THE EXOCRINE PANCREAS IN FAMILIAL HYPERLIPOPROTEINEMIA. (Ger.) Loffler, A. (Canton Hosp., Luzern, Switzerland), L. Filippini and W. Pulver. *Schweiz. Med. Wochenschr.* 101(18):634-637, 1971.

4223 A CASE OF AGENESIS OF THE DORSAL PANCREAS WITH INTERVENTRICULAR SEPTAL DEFECT IN AN INFANT. (E.) Gurson, C. T. (U. Istanbul Dept. Pediatr., Turkey), M. Tahsinoglu,

S. Yakacikli and T. Ertugrul. *Helv. Paediatr. Acta* 25(5):522-526, 1970.

4224 PSEUDOCYSTS OF THE PANCREAS. COMPLICATIONS AND TREATMENT. (Sp.) Del Castillo Morales, M. (Gen. Hosp., Mexico City, Mexico), C. Ledesma and R. Flores. *Rev. Med. Hosp. Gen. (Mex.)* 33(3):215-219, 1970.

4225 WHEN SHOULD WE THINK OF PANCREATIC CANCER IN A DIABETIC? (Fr.) Mundler, B. *Concours Med.* 93(3):370-376, 1971.

4226 ABERRANT PANCREAS. (Sp.) Acosta Pimentel, M. A. *Bol. Soc. Argent. Cir.* 31(23):557, 1970.

4227 CYSTADENOCARCINOMA OF PANCREAS. (E.) Mitre, R. J. (800 Miami Road, Jacksonville, Fla.), C. T. Montgomery and L. M. Sales. *J. Fla. Med. Assoc.* 58(3):28-30, 1971.

4228 THE SPECIAL DIAGNOSTIC METHODS AND OPERATIVE TREATMENT OF CARCINOMA OF THE PANCREAS AND OF THE PAPILLA. (Ger.) Kummerle, F. (U. Mainz Surg. Clin., Germany). *Aerztl. Fortbild.* 21(1):17-20, 1971.

4229 POST-TRAUMATIC PANCREATIC ASCITES. (E.) Chang, C.-H. (Nat. Taiwan U. Coll. Med., Taipei) and K.-M. Chen. *Am. J. Surg.* 122(1):129-131, 1971.

4230 DIAGNOSIS AND TREATMENT OF PANCREATIC TRAUMA. (E.) Bach R. O. (U. Michigan Med. Ctr., Ann Arbor) and C. F. Frey. *Am. J. Surg.* 121(1):20-29, 1971.

4231 OPERATIVE MANAGEMENT OF PANCREATIC AND DUODENAL INJURIES. (E.) Smith, A. D., Jr., W. C. Woolverton, R. F. Weichert, III and T. Drapanas (Tulane U. Sch. Med., New Orleans, La.). *J. Trauma* 11(7):570-576, 1971.

4232 RADIOLOGICAL CHANGES IN THE STOMACH AND DUODENUM IN THE COURSE OF CANCER OF THE PANCREATIC HEAD. (Pol.) Kulicz, A. (Med. Acad. Inst. Radiol., Zabrze, Poland). *Pol. Przegl. Radiol.* 34(4):503-512, 1970.

4233 DYSPHAGIA DUE TO MEDIASTINAL METASTASIS OF A LATENT CANCER OF THE PANCREAS. (Por.) Araujo Teixeira, A. M. (Sch. Med., Porto, Portugal), A. M. Estima Martins and J. V. Saleiro E. Silva. *Medico (Porto)* 58(1013):347-353, 1971.

4234 PRESENT STATUS OF PANCREAS TRANSPLANTATION. (Ger.) Largiader, F. (Univ. Surg. Clin., Zurich, Switzerland) *Bull. Schweiz. Akad. Med. Wiss.* 26(3-4):247-258, 1970.

See also numbers: 3843, 3845, 3850

PANCREATITIS

4235 PANCREATICODUODENAL LYMPH FLOW AND LIPASE ACTIVITY IN ACUTE EXPERIMENTAL PANCREATITIS. (E.) Papp, M. (Hungarian Acad. Sci. Inst. Exp. Med., Budapest) É. P. Németh and E. J. Horváth. *Lymphology* 4(2):48-53, 1971.

Bicarbonate level and pH of the pancreaticoduodenal lymph was higher, while pCO_2 lower than the same parameters in arterial and venous blood obtained from the same dog while awake and in arterial blood and thoracid duct lymph obtained during anesthesia. Pancreaticoduodenal lymph flow was not affected by intrapancreatic injection of bile but was significantly decreased by sunflower oil. Lipase activity, initially higher in pancreaticoduodenal lymph than in venous effluent of that area, was increased almost ten-fold in both lymph and plasma. Oil increased lipase activity in blood plasma about 3 times. Bile as well as sunflower oil caused gross pancreatic edema, and eventually acute necrosis of the gland. Thoracic duct lymph drainage may be of therapeutic value in the early stages of acute pancreatitis caused by reflux bile, but not in advanced stages of acute pancreatitis from biliary reflux or in pancreatic self digestion from chyme reflux.

4236 THE FORMATION OF LYSOLECITHIN IN RAT PANCREAS AFTER EXPERIMENTALLY INDUCED

BILE SALT PANCREATITIS. (E.) Arnesjö, B. (U. Lund Chem. Ctr., Sweden). *Acta Chir. Scand.* 137(4):351-354, 1971.

After retrograde injection of different concentrations of bile salt into the rat pancreatic duct, sodium taurodeoxycholate caused the most severe change of the pancreatic tissue with an extensive edema and hemorrhagic conversion of the central parts of the gland. Bile salt and rat pancreatic phospholipase A injections produced similar severe changes, while sodium taurocholate, alone, produce less severe changes than taurodeoxycholate. No free trypsin activity was found in the pancreatic tissue. Sodium taurodeoxycholate was more potent than sodium taurocholate in causing a conversion of lecithin to lysolecithin. Relatively high concentrations of bile salts were needed to cause significant lysolecithin formation after retrograde injection of phospholipase into the pancreatic duct. Bile reflux may be important in the development of acute pancreatitis in man, since high concentrations of lysolecithin are present in necrotic parts of the pancreas in humans who died from acute pancreatitis.

4237 SURGERY OF CHRONIC PANCREATITIS. (E.) Griffin, J. M. (John Cochran VA Hosp., St. Louis, Mo.) and G. B. Starkloff. *Am. J. Surg.* 122(1):18-21, 1971.

Forty-two patients underwent 70 operations for chronic relapsing pancreatitis. Most patients were male and all were alcoholics. The most common indications for operation was the presence of an epigastric mass and associated epigastric pain. Other indications were constant or recurrent intractable pain and massive upper gastrointestinal bleeding. Only 5 of 19 patients with chronic pancreatitis with induration of the head of the pancreas or frank abscess formation had excellent or good results. Six of 13 patients with a pseudocyst had good results. Two of 3 patients operated for bleeding had poor results and both died. The incidence of complications after primary operation was high and most complications were serious: postoperative gastrointestinal bleeding, diabetes mellitus, common duct obstruction and intestinal obstruction. Seven patients died after either primary or secondary operations. Surgical treatment of chronic pancreatitis in a predominantly alcoholic population is beset with complications and is associated with a high mortality.

4238 INTRA-ACINAR LIPOLYSIS, AN EARLY SIGN OF INTRAVITAL PANCREATIC AUTODIGESTION. (E.) Bácsy, E. (Hungarian Acad. Sci. Inst. Exp. Med., Budapest), Z. Nagy and M. Papp. *Acta Med. Acad. Sci. Hung.* 27(3):331-335, 1970.

Thirty minutes after sunflower oil injection in dogs (6-8 ml through duct of Santorini) the oil appeared as droplets in pancreatic acinar cells of biopsy specimens. Between the 90th and 120th minute, such droplets occupied a large part of the cytoplasm in nearly all these cells. At 15 minutes after oil injection, fatty acids appeared in the acinar cells first as a delicate, afterwards as a rather coarse brown precipitate. The oil in the efferent ducts and in the interstitium likewise assumed a brown color, pointing to increased fatty acid content. Electromicroscopy examination revealed the presence of lipid droplets in apparently intact acinar cells. Autophagic vacuoles contained disintegrating endoplasmic reticulum, and some of the zymogen granule content in circumscribed areas of these cells. Acid radicals set free during lipolysis probably produced locally an acid milieu which favored proteolysis, phospholipolysis, elastolysis or all 3 resulting in autolysis.

4239 ACUTE PANCREATITIS WITH HYPERLIPEMIA. (E.) Cameron, J. L. (Johns Hopkins Med. Inst., Baltimore, Md.), C. Crisler, S. Margolis, T. R. DeMeester and G. D. Zuidema. *Surgery* 70(1):53-61, 1971.

Nineteen patients were seen with lactescent serum during an attack of acute pancreatitis. Abnormalities in carbohydrate metabolism are common in patients who develop hyperlipidemia. Five patients had a family history of diabetes but were not diabetic and 5 patients were diabetic, 3 being in ketoacidosis at the time of presentation with pancratitis. Most patients were heavy consumers of alcohol, which was the presumed etiology of the pancreatitis. The serum amylase value was normal in 14 of 19 admissions and the lactescent serum value was often a clue to the diagnosis of pancreatitis. Since lactescent serum was a requisite for this series, serum triglycerides were elevated in all 19 patients; serum cholesterol and phospholipid levels were elevated in most. The lactescent serum (secondary to the hypertriglyceridemia) usually paralleled the clinical course of the pancreatitis and often cleared in 2 or 3 days as the pancreatitis resolved.

4240 A COMPARISON OF ALCOHOLIC PANCREATITIS IN RAT AND MAN. (E.) Sarles, H. (Res. Unit Dig. Pathol., Marseille, France), G. Lebreuil, F. Tasso, C. Figarella, F. Clemente, M. A. Devaux, B. Fagonde and H. Payan. *Gut* 12(5):377-388, 1971.

No gross or microscopic changes were noted in the pancreas or liver of 38 rats fed either a balanced diet or high-fat diet and given 3-12 g of ethanol/kg body weight daily. In 10 rats given larger doses, the only histological lesion in the pancreas was venous congestion, which was present to an even greater degree in the liver and kidneys. Rats on a high fat diet developed fatty livers. Pancreatic lesions were found in 13 of 20 rats exposed to 20% ethanol for 30 months and in 2 of 5 rats exposed for 20 months. The fundamental changes in the pathologic foci were common to both rat and man. These were protein plugs, some of which were calcified in the ducts; reduction of acinar cells, which were replaced by dilated ducts; and sclerosis. In addition to residual bodies and occasional lipid deposits, ductal or entroacinar cells displayed hypertrophy of the endoplasmic reticulum suggestive of a hyperactive state. Pancreatic juice samples from ethanol-exposed animals contained significantly higher protein concentrations. Protein precipitates appeared spontaneously in the pancreatic juice of animals exposed to alcohol. Beta - cell adenomata of the islets of Langerhans were noted in four of the animals treated with ethanol.

4241 CHEMICAL COMPOSITION OF FAT NECROSIS IN EXPERIMENTAL PANCREATITIS IN THE RAT. (E.) Storck, G. (Sahlgrenska Hosp., Goteborg, Sweden) and P. Björntorp. *Scand. J. Gastroenterol.* 6(3):225-230, 1971.

Sodium taurocholate injection into the pancreatic ducts produced experimental acute pancreatitis. Intra-abdominal fat necroses produced were collected and found to have an increased water content. The content of triglycerides was only about one-third of control fat and was less in the oldest fat necrosis. Free fatty acids contents were exceedingly high in the fat necroses and tended also to decrease with time. The calcium content, however, was lower after 12 hr than after 1-8 days. The fat necroses also contained greater amounts of phosphorus and serum calcium decreased below normal at 12 hr and 1 day after induction of pancreatitis. At 8 and 16 days, it was higher than normal . These findings are compatible with an initial hydrolysis of triglycerides in the necrotic areas, followed by a calcium deposition during the first 1 or 2 days.

4242 TRIGLYCERIDE HYDROLYSIS AND CALCIUM ACCUMULATION IN THE RAT EPIDIDYMAL FAT PAD EXPOSED IN VITRO TO NOREPINEPHRINE AND PANCREATIC LIPASE. (E.) Storck, G. (Sahlgrenska Hosp., Goteborg, Sweden) and P. Björntorp. *Scand. J. Gastroenterol.* 6(3):231-236, 1971.

The release of free fatty acids into a medium containing albumin as receptor was increased by both norepinephrine and pancreatic lipase. With norepinephrine the rate of release apparently declined with time, while with pancreatic lipase it increased. Essentially the same pattern was found for glycerol release although, without albumin in the medium, release was considerably lower in all systems. With pancreatic lipase the free fatty acid production was apparently not dependent on the presence of albumin. There was some calcium accumulation in fat pads when norepinephrine was added; however, lipase with and particularly without albumin, caused significant increases, compared with controls and systems containing norepinephrine. Pancreatic lipase is apparently at least one part of the active agent causing fat necrosis after acute pancreatitis.

4243 ACUTE PANCREATITIS. (Sw.) Andersson, A. (U. Umea Dept. Surg., Sweden) *Lakaritidningen* 68(9):961-969 & 1018, 1971.

4244 SEVERE ACUTE NECROHEMORRHAGIC PANCREATOPATHY. CURRENT CONCEPTS AND THERAPY. (Sp.) Saenz Dominguez C. (La Raza Med. Ctr., Mexico City, Mexico). *Cir. Cir.* 38(2):193-214, 1970.

4245 ACUTE PANCREATITIS IN CHILDREN. (Rum.) Tirlea, I., Z. Patiu, C. Mircioiu and M. Nana. *Cluj. Med.* 43(3):579-582, 1970.

4246 ACUTE POSTSPHINCTEROTOMY PANCREATITIS: REPORT OF SUCCESSFUL TREATMENT. (Fr.) Frank, P. and J. Weill. *J. Med. Strasbourg* 1(5): 397-401, 1970.

4247 EFFECT OF ANTIENZYME THERAPY ON THE HEPATIC FUNCTION OF PATIENTS WITH CHRONIC PANCREATITIS. (Rus.) Golubchenko, O. K. *Ter. Arkh* 43(4):45-49, 1971.

4248 SIMULTANEOUS DRAINAGE OF BILE AND PANCREATIC JUICE IN CHRONIC PANCREATITIS. (Sp.) Torre, L. (Municipal Hosp., Barcelona, Spain). *Barcelona Quir.* 14(6):466-470, 1970.

4249 PANCREATIC PROBLEMS. I. ACUTE PANCREATITIS. (E.) Zollinger, R. M. (Ohio State U. Coll. Med., Columbus, Ohio). *Postgrad. Med.* 49(3):91-95, 1971.

4250 RESULTS OF ANGIOGRAPHIC EXAMINATIONS IN PANCREATITIS. (Ger.) Lechner, G. (Vienna 1st Surg. Clin., Austria) and H. Pokieser. *Fortschr. Geb. Rotgenstr. Nuklearmed.* 114(1): 49-57, 1971.

4251 LONG TERM RESULTS OF DUODENOPANCREATECTOMY IN CHRONIC PANCREATITIS WITH LITHIASIS. (Ger.) Guillemin, G. (Hotel Dieu Surg. Clin., Lyon, France), J. Dubois and G. Braillon. *Actuelle Chir.* 6(1):17-26, 1971.

4252 THE KIDNEY IN ACUTE EXPERIMENTAL PANCREATITIS IN DOGS. AN ANATOMO-PATHOLOGICAL STUDY. (Fr.) Le Bodic, L. (Sch. Med., Nantes, France), J. Visset, P. Galle, M.-F. Le Bodic, F. Buzelin and J. Mussini-Montpellier. *Arch. Fr. Mal. App. Dig.* 60(4-5):189-202, 1971.

4253 PANCREATITIS COMPLICATED BY DIGESTIVE HEMORRHAGE DUE TO WIRSUNGORRHAGIA DURING AN ACUTE ATTACK. (Fr.) Lagache, G. (City Hosp., Lille, France), M. Vankemmel, C. L'Hermine, G. Depadt and J. Vankemmel. *Arch. Fr. Mal. App. Dig.* 60(4-5):235-246, 1971.

4254 BISELECTIVE ARTERIOGRAPHY IN CHRONIC PANCREATITIS CASES. (Fr.) Grellet, J., D. Melliere and J. C. Gaux. *J. Radiol. Electrol. Med. Nucl.* 52(1-2):105-106, 1971.

4255 POSSIBLE USE OF GLUCAGON IN THE TREATMENT OF PANCREATITIS. (E.) Knight, M. J. (St. George's Hosp., London), J. R. Condon and R. Smith. *Br. Med. J.* 2(5759):440-442, 1971.

4256 ROLE OF TRYPSIN IN SECONDARY MANIFESTATIONS OF ACUTE HEMORRHAGIC PANCREATITIS. (Fr.) Simon, G. (U. Toronto Dept. Pathol., Ontario, Canada) and J. P. Giacobino. *Can. Med. Assoc. J.* 105(1):52-55, & 62, 1971.

See also number: 3867

4257 THE BUDD-CHIARI SYNDROME - A NEW METHOD IN THE SURGICAL TREATMENT OF THE DISEASE. (E.) Dumanian, A. V. (St. Catherine Hosp., East Chicago, Ind.), H. G. Giragos, A. Sanders, C. J. Frahm and H. A. Hadidian. *Ann. Thorac. Surg.* 12(1):79-84, 1971.

A 33-year-old woman was hospitalized because of appetite loss, nausea, fatigue, and painless abdominal distention due to ascites. Her liver was enlarged and liver function tests were abnormal. Needle biopsy of the liver showed very severe congestion of the hepatic lobules. An inferior vena cavagram showed partial obstruction of the inferior vena cava from the site of entrance of the hepatic veins down to the level of the first lumbar vertebra. The occluded hepatic veins were opened and the inferior vena cava was reconstructed under profound hypothermia and total circulatory arrest with the use of a pump oxygenator. Following restoration of circulation, the pressure in the inferior vena cava had decreased from 18 to 8 mm Hg. Profound hypothermia and total circulatory arrest offer an opportunity to decompress both the inferior vena cava and the hepatic veins in patients with Budd-Chiari syndrome in whom both of these systems are occluded by the phlebitic process.

4258 PORTAL HYPERTENSION FOLLOWING SURGERY, X-RADIATION, AND ACTINOMYCIN D THERAPY OF NEPHROBLASTOMA. (E.) Roback, S. A. (Univ. Hosps., Minneapolis, Minn.), M. E. Nesbit, Jr., H. L. Sharp, G. J. D'Angio and A. S. Leonard. *J. Pediatr.* 78(6):1031-1035, 1971.

A 4.5-yr-old patient with a right sided Wilm's tumor was treated by radical nephrectomy, X-radiation, and actinomycin. She gradually developed severe portal hypertension that necessitated mesocaval shunting because of life threatening hemorrhage from esophageal varices. During pulmonary radiation therapy, hepatic exposure to radiation may have occurred, which in part could be responsible for the development of portal hypertension. Special precautions that might be taken to avoid hepatic exposure include the use of the postage stamp method of radiation therapy since the conventional portal for treatment of both lungs extends inferiorly to the T12 - L_1 level and therefore includes much of the liver.

4259 URINARY EXCRETION OF LIVER ANTIGENS IN EXPERIMENTAL HEPATIC DISEASES OF THE RAT. (E.) Durst, A. (Hebrew U.-Hadassah Med. Sch., Jerusalem, Israel), T. Dishon, E. Rosenmann and H. B. Boss. *Lab. Invest.* 25(1):35-41, 1971.

Antisera was prepared in rabbits against rat liver fractions and was used to detect hepatic tissue constituents in the urine. When urine of normal rats was subjected to immunodiffusion tests in agar gel, no liver antigens were detected. Examination of urine of rats with hepatic lesions produced by hepatotoxic agents or bile duct ligation revealed the presence of liver antigens. The procedure described may be helpful in recognizing parenchymal liver damage. Lack of cross-reactivity of the antiliver sera with kidney antigens could be of major significance since many hepatotoxic agents are also known to cause renal injury.

4260 FIBROGENESIS IN CONGENITAL HEPATIC FIBROSIS. AN ELECTRON AND LIGHT MICROSCOPIC STUDY. (E.) Albukerk, J. and J. L. Duffy (Nassau County Med. Ctr., East Meadow, Long Island, N. Y.). *Arch. Pathol.* 92(2):126-135, 1971.

Liver biopsy specimens of 3 brothers with congenital hepatic fibrosis revealed numerous fibrous bands transecting the sections. The widest ones, as thick as 2 mm, demonstrated compactly arranged bundles of collagen fibers, generally compressed fibroblasts, bile ducts of varying diameter and hypoplastic veins. Most of the connective tissue gave a negative diastase-resistant positive acid-Schiff reaction, except for the periductal connective tissue. Hepatocytes showed prominent nuclei and increased lipofuscin pigment. The characteristic fibrosis surrounding the biliary channels in the absence of parenchymal collapse, extrahepatic biliary obstruction, or an active cirrhotic process appears to be induced by the gradual maturation of the bile ducts, possibly as compensation for the often incomplete or absent basement membrane. Compression of intrahepatic portal vein branches by fibrosis may be the mechanism of portal hypertension in congenital hepatic fibrosis.

4261 THE PATHOLOGICAL SHAPE VARIABILITY OF THE JUNCTIONAL COMPLEXES ALONG THE INTERCELLULAR SPACES OF THE LIVER. (E.) Pavel, I. (Clin. Nutr. Diet. Dis., Bucharest, Rumania), S. Campeanus, H. Bonaparte and A. Petrovici. *Acta Hepatosplenol. (Stuttg.)* 18(3):153-165, 1971.

Liver biopsy material from patients with viral hepatitis, Gilbert's didease and Dubin-Johnson syndrome were studied. In one patient with viral hepatitis a great polymorphism was noted in the shape of the junctional complexes and the intercellular zones. Tightening for long portions of the adjacent hepatocyte cytoplasm was observed frequently. The convergence of the adjoining cell membranes and the diffuse band of dense cytoplasmic material were both hypertrophied. A certain winding of these intercellular spaces was obvious, and in the lumen of the intercellular zones was seen some electron-opaque material. The winding process, not so evident as in viral hepatitis, was also seen in Gilbert's disease. Dilatation of the spaces appeared first and was accompanied by the appearance of newly formed microvilli. In this case the junctional complexes were completely missing. In the liver of the Dubin-Johnson patient, the presence of another pathologic association was noticed, namely the winding without dilatation and with the presence of junctional complexes somewhat hypertrophied.

4262 LONG-TERM THERAPY OF WILSON'S DISEASE. (E.) Deiss, A. (U. Utah Coll. Med., Salt Lake City), R. E. Lynch, G. R. Lee and G. E. Cartwright. *Ann. Intern. Med.* 75(1):57-65, 1971.

Five patients with Wilson's disease were under continuous therapy with penicillamine for a period of 9 to 13 yr. Central nervous system manifestations including tremors, dysarthria and frank psychosis were eliminated over the course of treatment. During the ensuing years patients were free of clinical manifestations of liver disease including hepatomegaly and abnormal liver function studies. Kayser-Fleischer rings faded slowly over a period of 4 to 7 yr in all 5 patients. Renal manifestations (proteinuria, glycosuria and hypouricemia) and hematologic manifestations (mild anemia, leukopenia, and thrombocytopenia) also disappeared. Hypocupremia, hypoceruloplasminemia, and hypercupriuria have either persisted or become more severe during therapy. Apparently the response to chelation therapy is evidence that the clinical and pathologic manifestations of Wilson's disease are caused by the damaging effects of excessive deposition of copper in the tissues.

4263 PLASMA LECITHIN: CHOLESTEROL ACYLTRANSFERASE ACTIVITY IN LIVER DISEASE. (E.) Calandra, S. (U. Modena Inst. Gen. Pathol., Italy), M. J. Martin and N. McIntyre. *Eur. J. Clin. Invest.* 1(5):352-360, 1971.

Either in patients with obstructive jaundice or those with parenchymal liver disease, the proportion of plasma cholesterol present in the form of ester was lower than that found in normal subjects. Lecithin cholesterol acyltransferase (LCAT) activity was significantly lower in patients with both parenchymal and obstructive liver disease than in control subjects. A study of the effects of interaction between normal and jaundiced plasmas supported the hypothesis that the low LCAT activity was due mainly to a reduction in the plasma concentration of the enzyme. Bile acids produced an inhibition of only 2-4% when the concentration in the incubation system was 0.01 mmoles/liter. Bile salts are apparently not in vivo inhibitors of the enzyme. There was a significant negative correlation between plasma bile acid levels and LCAT activity and a positive correlation between enzyme activity and plasma cholesterol ester. Reduction in LCAT activity may be an important factor in the production of the low ester:free ratio found in almost all hepatic disorders.

4264 AN UNIQUE PRESENTATION OF SICKLE CELL DISEASE: PYOGENIC HEPATIC ABSCESS. (E.) Shulman, S. T. (U. Florida Coll. Med., Gainesville) and M. O. Beem. *Pediatrics* 47(6): 1019-1022, 1971.

A 4-year-old Negro male with sickle cell disease presented with a pyogenic liver abscess. Peptococcus species, a strictly anaerobic staphylococcus, was isolated from his blood on 2 occasions 2 weeks apart and was the probable causative agent of the liver abscess. The liver abscess probably represented a secondarily infected hepatic sickle cell infarction, since the patient with sickle cell disease is prone to develop infarction in various organs. Since the patient with sickle cell disease is inordinately subject to extraintestinal infection by enteric organisms, hepatic infarcts commonly become infected and produce abscesses.

4265 ELECTIVE PORTASYSTEMIC SHUNTS: MORBIDITY AND SURVIVAL DATA. (E.) Barnes, B. A. (Massachusetts Gen. Hosp., Boston), F. W. Ackroyd, G. E. Battit, P. A. Kantrowitz, R. H. Schapiro, W. E. Strole, Jr., D. P. Todd and W. V. McDermott, Jr. *Ann. Surg.* 174(1):76-84, 1971.

Most of the splenorenal shunts were for patients with intrahepatic block associated with hepatic disease, whereas, 103 portacaval shunts were performed in patients with intrinsic disease of the liver. The average patient having a splenorenal shunt was in better physical condition preoperatively and had less advanced hepatic disease than those undergoing portocaval shunt. A comparison of survival rates of the 2 series of patients revealed essentially similar results. A substantial decrease in hospital mortality from 24 to 13% was noted recently. Although the incidence of upper gastrointestinal bleeding is larger in the splenorenal group, the proportion of fatal hemorrhages is larger after portocaval shunts. Approximately 33% of these patients with portocaval shunts and 25% with splenorenal shunts developed encephalopathy. Results of portosystemic shunting are superior in patients selected for splenorenal shunts.

4266 CYTOLOGICAL IDENTIFICATION OF PRIMARY HEPATIC CARCINOMA CELLS. (E.) Ekelund, P. (U. Helsinki Dept. Med., Finland) and C. Wasastjerna. *Acta Med. Scand.* 189(5):373-375, 1971.

Tumor cells were easily recognized in May-Grunwald-Giemsa (MGG) stained preparations of patients with primary hepatic carcinoma and patients with liver metastases of various tumors. In cases with primary hepatic carcinoma, staining for the demonstration of naphthylamidase revealed the occurrence of fragments of enzyme positive bile canaliculi among the tumor cells. Some degree of diffuse cytoplasmic naphthylamidase activity was observable in part of the tumor cells. In patients with liver metastases of various tumors (lung, gallbladder, pancreas, breast) the tumor cells were completely devoid of naphthylamidase activity. Tumor cells in cases of bile duct carcinoma revealed a granular, enzyme-positive reaction; nevertheless, bile canaliculi or fragments were not observed among the tumor cells. The naphthylamidase staining method may be helpful in the interpretation of cytological material from patients with primary hepatocellular cancer.

4267 INACTIVATION OF GASTRIN-LIKE SYNTHETIC PEPTIDE BY THE LIVER AND SERUM, AND ITS CLINICAL SIGNIFICANCE.

(E.) Ishimori, A. (Tohoku U. Sch. Med., Sendai, Japan), K. Nemoto, M. Shimoyama and S. Yamagata. *Tohoku J. Exp. Med.* 103(1):61-70, 1971.

The acid secretory response of the rat stomach was compared during the alternate administration of gastrin-like AOC-tetrapeptide to the liver-irrigating superior mesenteric vein and femoral vein to see if the liver inactivates the peptide. No acid secretory response occurred after the administration of AOC-tetrapeptide through the superior mesenteric vein. CCl_4-induced liver damage reduced the inactivation of the tetrapeptide by the liver. Incubation of AOC-tetrapeptide with serum at 37° C induced a rapid decline of secretion-stimulatory effect of AOC tetrapeptide, whereas the incubation with serum at 4° C and with 0.9% saline solution at 37° C reduced the activity only gradually. The high incidence of peptic ulcer among patients with liver disease may be due in part to hypergastrinemia caused by a disturbed inactivation of endogenous gastrin in the liver.

4268 ANEURYSM OF THE HEPATIC ARTERY: RECONSTRUCTION WITH SAPHENOUS VEIN-GRAFT.

(E.) Rutten, A. P. M. (St. Laurentius Hosp., Roermond, Netherlands) and P. J. H. Sikkenk. *Br. J. Surg.* 58(4):262-266, 1971.

A case of aneurysm of the hepatic artery is described. Fusiform and soccular type aneurysms of arteriosclerotic origin, which are the most common type, were found in this patient. In 75% of the cases of hepatic artery aneurysm reported in the literature, the localization of the aneurysms is extrahepatic and the majority of extrahepatic aneurysms are distal to the origin of the gastroduodenal artery. The typical syndrome which should focus attention on the correct diagnosis is a triad of recurrent pain, jaundice and melena. Radiological changes in the form of oval or circular calcium opacities in the right upper abdomen or filling defects at the upper margin of the bulbus duodenum can also indicate the presence of an aneurysm. The patient recovered following resection of the aneurysm and reconstruction with an autogenous vein (saphenous) graft, but died 18 months later as a consequence of duodenal ulcer perforation into the graft. In the vicinity of the stomach and pancreas, possibly a synthetic graft should be preferred.

4269 SOME OBSERVATIONS ON HEPATIC SINUSOIDS. A COMMON PATTERN OF HISTOLOGICAL AND BIOCHEMICAL CHANGES IN ULCERATIVE COLITIS AND SINUSOIDAL PORTAL HYPERTENSION.

(E.) Sommerschild, H. (U. Oslo Surg. Dept. B, Norway) and T. Kluge. *Acta Chir. Scand.* 137(3):257-263, 1971.

Patients with ulcerative colitis and those with sinusoidal portal hypertension had similar elevations of alkaline phosphatase. The liver appeared macroscopically normal in all cases. Hypertrophy of Kupffer cells, narrowing of sinusoidal lumina and perisinusoidal fibrosis were all observed in both ulcerative colitis and sinusoidal portal hypertension. The hypertension of the latter disease may be explained by the above microscopic changes. The morphological similarities between patients with ulcerative colitis and patent with sinusoidal portal hypertension suggests a common response of the reticulo-endothelial system with hypertrophy and hyperactivity of Kupffer cells. The perisinusoidal fibrosis may be due to an initial increase of fluid in the space of Disse leading to collagen formation from fibroblasts or particularly from the ACT cells.

4270 INDICATIONS FOR ORTHOTOPIC LIVER TRANSPLANTATION: WITH PARTICULAR REFERENCE TO HEPATOMAS, BILIARY ATRESIA, CIRRHOSIS, WILSON'S DISEASE AND SERUM HEPATITIS.

(E.) Starzl, T. E. (U. Colorado Sch. Med., Denver), G. Giles, J. R. Lilly, H. Takagi, G. Martineau, G. Schroter, C. G. Halgrimson, I. Penn and C. W. Putnam. *Transplant. Proc.* 3(1):308-312, 1971.

The most desirable candidates for orthotopic liver transplantation were those without neoplasms. The performance of this procedure for benign disease is more difficult since the patients tend to be more ill and to have more advanced portal hypertension. Moreover, if the diagnosis is biliary atresia, an increased incidence of vascular anomalies can be anticipated. Nevertheless, biliary atresic patients have been the longest survivors after liver transplantation. Because of high rate of recurrent carcinoma, liver replacement was considered in cases of hepatoma only under exceptional circumstances. Transplantation should be considered at an earlier time in cases of postnecrotic cirrhosis in which the maximum value of medical management and of abstinence from alcohol has already been realized. In one patient the basic error in Cu metabolism was apparently corrected by the transplant.

4271 A CLINICAL STUDY OF PARTIAL LIVER IRRADIATION. (E.) Nomura, S. (Hiroshima U. Sch. Med., Japan). *Hiroshima J. Med. Sci.* 19(2-3):63-72, 1970.

Deteriorization of nutritional status due to radiation therapy of liver tumors was not observed. Radiation sickness developed occasionally, but with partial irradiation the side effects were slight. The radiosensitivity of tumors was largely dependent on the type of tumor and its histological characteristics. The metastases of malignant lymphoma and ovarian tumor of the liver especially showed a high sensitivity to radiation. Protective therapy (steroid hormones) were administered in order to suppress localized liver dysfunction and to prevent fibrosis. Pathological liver changes which on the scintogram showed depression of localized liver function were called histological radiation hepatitis. In evaluating the residue or disappearance of tumor following radiation therapy, the use of liver scintigrams under nonsuppression before and after radiation therapy is necessary.

4272 CONTRIBUTION TO THE PROBLEM OF HEPATOCEREBRAL SYNDROME IN CHILDREN. (E.) Gostof, R. (Bulovka Hosp. Pediatr. Dept., Prague), K. Kouba, M. Klimová, E. Hlavatá and L. Seidler. *Acta Hepatosplenol. (Stuttg.)* 18(3):183-191, 1971.

The course of hepatocerebral syndrome in 5 children (4 of whom could not be saved) was described. Basic macroscopic findings at autopsy were severe steatosis of the liver and severe cerebral edema. The steatosis of the liver was so severe that the hepatic tissue had the appearance of fatty tissue. Other common features of the disease was intense vomiting, hepatomegaly and elevated transaminases. The disease generally had a rapid course and fatal outcome. The primary disorder is probably in the liver and the trigger mechanism may be a virus disease. Titers against adenoviruses were recorded in the 1 surviving patient. Therapy should be oriented towards control of cerebral edema and metabolic upset. All cases must be examined virologically and the ammonia level assessed.

4273 SPECIFIC CYTOPLASMIC GLUCOCORTICOID HORMONE RECEPTORS IN HEPATOMA TISSUE CULTURE CELLS. (E.) Baxter, J. D. (U. California Dept. Biochem. Biophys., San Francisco) and G. M. Tomkins. *Proc. Natl. Acad. Sci. USA* 68(5): 932-937, 1971.

Kinetic and equilibrium studies showed that each hepatoma tissue culture cell contained about 150,000 molecules of a specific protein that reversbly binds adrenal steroid hormones like radioactive dexamethasone. The steroid-receptor complexes sediment more rapidly at low ionic strength than at increased salt concentrations, and the binding reaction was inhibited by reagents that interact with protein-SH groups. These specific receptors in some way apparently mediate the actions of glucocorticoid hormones, since there was a good correlation between the association with the receptors and the biological activity of the steroids as inducers of both tyrosine aminotransferase and cell adhesiveness.

4274 REGIONAL VARIATIONS IN PRIMARY LIVER CANCER IN IVORY COAST. (E.) Tuyns, A. J. (Int. Agency Res. Cancer, Lyon, France), R. Loubière and F. Duvernet-Battesti. *J. Natl. Cancer Inst.* 47(1):131-135, 1971.

Of the 79 observed cases of primary hepatoma, more were found in the savanna area of Ivory Coast, West Africa, than were seen in the coastal tropical forests of that area. This type of cancer was seen most often in moles. There may be a relationship between liver cancer and the greater exposure to food contaminants, particularly aflatoxin, in the savanna where peanuts and other stored crops are suspected to be heavily contaminated. An experiment providing 2 parallel sets of data for incidence of liver cancer as measured by application of the α-fetoprotein test, and aflatoxin exposure measured from collected food samples, is currently being undertaken.

4275 CLINICAL AND BIOCHEMICAL STUDIES OF HEREDITARY HEPATIC PORPHYRIA IN CHINESE SUBJECTS IN TAIWAN. (E.) Tu, J.-B. (Nat. Taiwan U. Hosp., Taipei), R. Q. Blackwell and Y.-S. Feng. *Metabolism* 20(7):629-641, 1971.

The present study demonstrated the existence of patients with 2 forms of hepatic porphyria among Chinese in Taiwan. The cutaneous type appeared to be more common than the acute intermittent type. Mental aberration, sometimes the only presenting symptom of hepatic porphyria, were found in the latent as well as in the overt cases during both remission and acute stages of the disease. A total of 29% of the children of porphyria variegata patients showed slightly increased fecal porphyrin excretion and were considered latent cases. The extremely low levels of fecal protoporphyrin found in some normal subjects and in acute intermittent porphyric patients may be due to the predominantly vegetable nature of their diet. D-penicillamine therapy was tried briefly in one patient with porphyria variegata with encouraging clinical and biochemical signs of improvement.

4276 ENZYMATIC AND HISTOLOGIC EFFECTS OF SIDE-TO-SIDE PORTACAVAL ANASTOMOSIS ON THE PRIMATE LIVER. (E.) Dinbar, A. (UCLA Sch. Med., Los Angeles, Calif.) and E. W. Fonkalsrud. *Surg. Gynecol. Obstet.* 133(1):35-38, 1971.

One week after side-to-side portacaval anastomosis 5 monkeys underwent proximal occlusion of the hepatic artery and portal vein for 60 min. Two of the 5 monkeys died on the second postoperative day following ischemia. The remaining 3 survived from 4 to 5 months and died with a clinical picture of stupor and coma as is commonly seen with ammonia intoxication and encephalopathy. Both SGPT and acid phosphatase levels rapidly increased 2 to 4 hr after the portacaval anastomoses and reached maximum values after 18 to 24 hr and declined during the ensuing week. Liver biopsy of the 2 monkeys who died on the second day showed no histopathologic changes within the liver, whereas biopsies obtained from monkeys at 4 to 5 mo showed a moderate degree of passive engorgement, generally panlobular in character. In these areas, the hepatic cell plates were mildly atrophic, but no other evidence of hepatocellular degeneration or necrosis was observed. Apparently, the hypoxic insult to the liver caused by the hemodynamic changes due to the shunt had a definite but reversible effect on hepatic cells.

4277 STREPTOCOCCAL CELL WALL STRUCTURE INDUCING HEPATIC GRANULOMA. (E.) Heymer, B. (U. Ulm Dept. Pathol., Ulm/Donau, Germany), H. Schäfer, W. Schachenmayr, O. Haferkamp and W. C. Schmidt. *Arch. Pathol.* 92(2): 84-92, 1971.

The injection of group A streptococcal cell walls into mice produced granulomatous lesions comparable to those induced by the injection of whole heat-killed group A streptococci. Whereas whole or trypsinized cell walls were almost as effective in inducing typical granulomata, C-carbohydrate, cell membrane, and highly purified mucopeptide II were ineffective. The deproteinized particulate cell wall was the streptococcal component primarily responsible for the granulomatous tissue response. The i.v. injection of heat-killed A-variant and group B, but not group D, streptococci into mice resulted in the appearance of liver granulomata very similar to those seen following group A injection. The presence of lymphocytes and small numbers of plasma cells in the more peripheral zones of the granulomata and the fact that some of these cells contain anti-carbohydrate antibody may indicate that deposits of bacterial antigens present in the granulomata provide a stimulus for local cellular antibody formation or invasion by immunologically competent cells.

4278 INTERRUPTION OF THE ENTEROHEPATIC CIRCULATION OF BILE ACIDS IN MAN: COMPARATIVE EFFECTS OF CHOLESTYRAMINE AND ILEAL EXCLUSION ON CHOLESTEROL METABOLISM. (E.) Grundy, S. M. (Phoenix Indian Med. Ctr., Ariz.), E. H. Ahrens, Jr. and G. Salen. *J. Lab. Clin. Med.* 78(1):94-121, 1971.

In both cholestyramine and ileal exclusion in 9 patients with hypercholesterolemia, the enterohepatic circulation of bile acids was interrupted by interference with their reabsorption. Cholesterol synthesis in the liver and intestinal tract was enhanced as well as its conversion into bile acids. Although most patients revealed a decrease in plasma cholesterol, in 2 patients with severe hypercholesterolemia, both cholestyramine and ileal exclusion produced a slight rise in plasma levels. Bile acids directly inhibited cholesterol synthesis in the intestinal mucosa of man; nevertheless, cholesterol synthesis in the liver may be regulated by the enterohepatic pools of bile acids, either through their control of cholesterol absorption or by direct action in the liver. Ileal exclusion and cholestyramine appeared to be equally effective in reducing plasma cholesterol levels in patients with all but the most severe forms of familial hypercholesterolemia.

4279 SELECTIVE SURGICAL TREATMENT OF HYDATID CYSTS OF THE POSTERIOR ASPECT OF THE LIVER. THE DIAGNOSTIC VALUE OF RADIOISOTOPE SCINTIGRAPHY. (Sp.) Puig, R. (Montevideo Sch. Med., Uruguay), R. Rubio and J. J. Touya. *Cir. Uruguay* 40(2):158-163, 1970.

4280 LUPUS ERYTHEMATOSUS INDUCED BY PENICILLAMINE IN A CASE OF WILSON'S DISEASE. (Fr.) Boudin, G. (Salpetriere Hosp., Paris), B. Pepin and P. Godeau. *Ann. Med. Interne (Paris)* 122(2):269-293, 1971.

4281 LUPUS SYNDROME INDUCED BY D-PENICILLAMINE IN A CASE OF WILSON'S DISEASE. IMMUNOLOGIC STUDY BY THE LEUKOCYTE MIGRATION TEST. (Fr.) Harpey, J. P. (Lab. Exp., Pathol. Immunol., Paris), R. Moulias, J. M. Goust and P. Berthaux. *Ann. Med. Interne (Paris)* 122(2): 261-267, 1971.

4282 CORRELATION OF ANTERIOR LIVER SCANS AND EXPLORATORY SURGERY WITH AUTOSPY. (E.) Sethi, G. (U. Kansas Med. Ctr., Kansas City), N. L. Martin, A. W. Templeton and R. C. Robinson. *J. Kans. Med. Soc.* 72(3):120-123 & 127, 1971.

4283 LIVER SCINTISCANS IN HODGKIN'S DISEASE. (It.) Ascari, E. (U. Modena Inst. Spec. Med. Pathol., Italy), G. C. Canossi and V. Silingardi. *Minerva Med.* 61(98):5652-5658, 1971.

4284 CHOICE OF SURGICAL TECHNIQUE IN HYDATID ECHINOCOCCUS OF THE LIVER. (Rus.) Novokreshchenov, L. B. *Klin. Khir.* 50(10):27-31, 1970.

4285 AMEBIC HEPATIC ABSCESS. (TREATMENT WITH AMINOSIDINE SULFATE.). (Sp.) Flores Olloqui, F. *Rev. Esp. Enferm. Apar. Dig.* 34(4):425-432, 1971.

4286 RADIOPORTOGRAPHY IN DISEASES OF THE LIVER AND EXTRAHEPATIC PORTAL HYPERTENSION IN CHILDREN. (Rus.) Savinkina, R. A. and I. E. Malakhovskii. *Med. Radiol. (Mosk.)* 16(2):18-24, 1971.

4287 TYPE III GLYCOGENOSIS: DESCRIPTION OF ONE CASE. (It.) Crisalli, M. (Giannina Gaslini Inst., Genoa, Italy), F. M. Chiossi, B. M. Belotti and R. Monteverde. *Gaslini* 2(1): 52-60, 1970.

4288 THE SIGNIFICANCE OF HISTOLOGICAL CHANGES OF THE LIVER AND THE ADRENALS IN ACUTE CARDIAC FAILURE. (Jap.) Nakanishi, H. (Osaka U. Med. Sch., Japan). *Nippon Hoigaku Zasshi (Jap. J. Leg. Med.)* 24(4):289-313, 1970.

4289 THE COMPARATIVE EVALUATION OF MORPHOLOGICAL, HISTOCHEMICAL AND FUNCTIONAL CHANGES OF THE LIVER IN PATIENTS WITH CHOLECYSTITIS AND STOMACH ULCERS. (Rus.) Avdei, L. V. and E. N. Petrovich. *Vestn. Khir.* 105(11):27-32, 1970.

4290 A NEW FORM OF IDIOPATHIC CHRONIC JAUNDICE (PHYSIOPATHOLOGIC HYPOTHESIS). (Fr.) Hadchouel, P. (INSERM, Paris, France), A. Charbonnier and A. Lageron. *Rev. Med. Chir. Mal. Foie* 46(2):61-68, 1971.

4291 A RADIOLOGIC APPROACH TO OBSTRUCTIVE JAUNDICE AND DISEASE IN THE REGION OF THE PANCREAS. (E.) Agee, O. F. (U. Florida Dept. Radiol. Gainesville, Fla.) and J. V. Kaude. *Surg. Gynecol. Obstet.* 132(4):614-627, 1971.

4292 ENCEPHALOPATHY IN THE RAT WITH PORTACAVAL SHUNT: AN ANIMAL MODEL FOR THERAPEUTIC TRIALS. (Ger.) Herz, R. (Univ. Neurol. Clin., Bern, Switzerland), F. Robert and J. Bircher. *Schweiz. Med. Wochenschr.* 101(20):739, 1971.

4293 ENZYMOLOGY OF EXPERIMENTAL LIVER DISEASE IN MARMOSET MONKEYS. I. PATTERNS OF ENZYME ACTIVITY IN LIVER, OTHER ORGANS AND SERUM OF MARMOSETS, COMPARED TO MAN AND OTHER MAMMALS. (E.) Mohr, J. R. (Presbyterian-St. Luke's Hosp., Chicago, Ill.), H. Mattenheimer and A. W. Holmes. *Enzyme* 12(1):99-116, 1971.

4294 INTRABILIARY RUPTURE OF HYDATID CYST OF THE LIVER. (E.) Al Hashimi, H. M. (Univ. Med. Coll., Baghdad, Iraq). *Br. J. Surg.* 58(3):228-232, 1971.

4295 ASSOCIATION BETWEEN AFLATOXIN CONTENT OF FOOD AND HEPATOMA FREQUENCY IN UGANDA. (E.) Alpert, M. E. (Massachusetts Gen. Hosp., Boston), M. S. R. Hutt, G. N. Wogan and C. S. Davidson. *Cancer* 28(1):253-260, 1971.

4296 SURGICAL TREATMENT OF HYDATID CYST OF THE LIVER. (E.) Dintsman, M. (Beilinson Hosp., Petah Tikva, Israel), C. Chaimoff, Y. Woloch and E. Lubin. *Arch. Surg.* 103(1):76-78, 1971.

4297 DNA MEASUREMENT ON CELL NUCLEUS OF NORMAL LIVER, ADENOMA, AND HEPATOMA IN MICE: HISTOLOGIC FEATURES. (E.) Inui, N. (Cancer Inst., Toshima Ku, Tokyo), S. Takayama and N. Kuwabara. *J. Natl. Cancer Inst.* 47(1): 47-58, 1971.

4298 SERUM LACTIC DEHYDROGENASE AND ITS ISOENZYMES IN HEPATIC DISORDERS. (E.) Ramdeo, I. N. (Dr. S. N. Med. Coll., Jodhpur, India) and K. C. Joshi. *Am. J. Gastroenterol.* 55(5):459-465, 1971.

4299 EXPERIENCE WITH THE SURGICAL TREATMENT OF LIVER ECHINOCOCCOSIS. (Jap.) Kako, N. (Hirosaki U. Sch. Med., Japan), H. Yagihashi and E. Sekino. *Geka Chiryo (Surg. Ther.)* 22(4):477-481, 1970.

4300 METHYLATION OF TRANSFER RNA BY MONKEY LIVER AND HEPATOMA INDUCED BY N-NITROSODIETHYLAMINE. (E.) Waalkes, T. P. (NCI, Bethesda, Md.), R. H. Adamson, R. W. O'Gara and R. C. Gallo. *Arch. Int. Pharmacodyn. Ther.* 191(1):189-195, 1971.

4301 RETICULOSARCOMA ANGIOPLASTICUM OF THE LIVER AND OLD ECHINOCOCCUS INFECTION. (Ger.) Baghirzade, M. F. (U. Hamburg Pathol. Inst., Germany), E. U. Hertel and P. Schumacher. *Acta Hepatosplenol. (Stuttg.)* 18(3):224-234, 1971.

4302 A SIMPLIFIED CLAMP FOR HEPATIC RESECTION. (E.) Storm, F. K. (UCLA Sch. Med., Los Angeles, Calif.) and W. P. Longmire, Jr. *Surg. Gynecol. Obstet.* 133(1):103-104, 1971.

4303 BLUNT RUPTURE OF THE HEPATIC ARTERY: A REPORT OF TWO UNUSUAL CASES. (E.) Leber, R. E. and H. A. Hume (3 East Ridley Ave., Ridley Park, Pa.). *J. Trauma* 11(7):625-628, 1971.

4304 SPONTANEOUS RUPTURE OF THE LIVER DURING PREGNANCY. (E.) Utley, J. R. (U. California Dept. Surg., San Francisco). *Surg. Gynecol. Obstet.* 133(2):250-252, 1971.

4305 LIVER SCINTISCANNING IN ACUTE HEPATIC NECROSIS. (E.) Fleischer, M. R. (King's Coll. Hosp., London), P. Sharpstone, S. B. Osborn and R. Williams. *Br. J. Radiol.* 44(521):401-402, 1971.

4306 HEPATIC ARTERY OCCLUSION FOLLOWING HEPATIC ARTERY CATHETERIZATION. (E.) Lucas, R. J. (Grace Hosp., Detroit, Mich.), O. Tumacder and G. S. Wilson. *Ann. Surg.* 173(2): 238-243, 1971.

4307 DIETETIC TREATMENT IN LIVER DISEASES. CHRONIC DISEASES. (Ger.) Knick, B. (German Diagn. Clin., Weisbaden), R. Ottenjann, J. Gruner and G. Kanzler. *Dtsch. Med. Wochenschr.* 96(7):298-299, 1971.

4308 EVALUATION OF EARLY ISCHEMIC CHANGES OF THE LIVER. (Cz.) Bednar, B. (Charles U. Inst. Pathol. Anat., Prague). *Cesk. Patol.* 7(1):17-26, 1971.

4309 THERAPEUTIC CONSIDERATIONS IN SELECTED FORMS OF ACUTE AND CHRONIC LIVER DISEASE. (E.) Rogers, A. I. (Univ. Sch. Med., Miami, Fla.). *Med. Clin. North Am.* 55(2):373-390, 1971.

4310 SUPERSELECTIVE ANGIOGRAPHY OF THE BRANCHES OF THE CELIAC TRUNK. (Ger.) Bucheler, E. (Univ. Radiol. Clin., Bonn, Germany) and M. Thelen. *Roentgenblatter* 24(1):11-25, 1971.

4311 FAMILIAL BENIGN CONJUGATED HYPERBILIRUBINEMIA WITH THE PRESENCE OF A PIGMENT IN THE LIVER. DUBIN-JOHNSON SYNDROME. (Cz.) Sosovec, V. (NSP Dept. Intern. Med., Levoca, Czechoslovakia) and J. Pesek. *Vnitrni Lek.* 17(4):382-387, 1971.

4312 DISORDERS OF PROTEIN METABOLISM IN HEPATIC DISORDERS. (Ger.) Kuhn, H. A. (Justus Liebig U. Med. Clin., Giessen, Germany). *Biotest Mitt.* 28:81-87, 1970.

4313 CONGENITAL HEPATIC FIBROSIS. (Sp.) Soriano, M. (Sch. Med., Barcelona, Spain). *Gac. Med. Esp.* 44(12):467-468, 1970.

4314 RENAL FUNCTION IN JAUNDICE. (E.) Sitprija, V. (Chulalongkorn U. Sch. Med., Bangkok, Thailand). *J. Med. Assoc. Thai.* 53(11):759-761, 1970.

4315 CALCULI OF THE INTRAHEPATIC BILE DUCTS. (Rus.) Gerasimenko, A. A. and V. F. Onishchuk. *Klin. Khir.* 50(10):17-21, 1970.

4316 ISOLATED BILIARY CYSTS OF THE LIVER. (Fr.) Moreaux, J. and P. Bloch. *Arch. Fr. Mal. App. Dig.* 60(4-5):203-224, 1971.

4317 HYPERAMINOTRANSFERASEMIA IN OBSTRUCTIVE JAUNDICE. (Rus.) Vitlin, V. I. and R. M. Guzovatsker. *Klin. Khir.* 50(10):21-25, 1970.

4318 JAUNDICE AND SURGERY. (Sp.) Sapisochin, E. (Israelita Ezrah Hosp., Buenos Aires, Argentina), J. C. Gunning and A. Lewin. *Prensa Med. Argent.* 57(39):1830-1834, 1970.

4319 RATIONALE OF PROTRACTED AMBULATORY INFUSION CHEMOTHERAPY IN HEPATIC METASTASES FROM COLONIC CANCER. (E.) Baden, H. (Bispebjerg Hosp., Copenhagen, Denmark), B. Andersen and G. Risum. *Scand. J. Gastroenterol.* 6(Suppl. 9):177-180, 1971.

4320 HEMODYNAMICS IN CONGESTIVE LIVER. (Sp.) Martinez Martinez, A. (Sch. Med., Valencia, Spain), R. García Civera, V. López Merino and F. J. García-Conde Gómez. *Rev. Esp. Enferm. Apar. Dig.* 34(4):351-364, 1971.

4321 A COMPARISON OF INDIVIDUAL α-FETOPROTEIN OF HUMAN FETUSES AND PATIENTS WITH PRIMARY CANCER OF THE LIVER. (Rus.) Gusev, A. I. (N. F. Gamaleia Inst. Acad. Med. Sci., Moscow), A. K. Iazova and E. V. Poliakova. *Biull. Eksp. Biol. Med.* 71(3):69-72, 1971.

4322 ACCUMULATION OF ^{197}Hg-LABELED NEOHYDRINE (CHLORMERODRIN) BY THE LIVER IN LATENT INSUFFICIENCY OF THE SOLITARY KIDNEY. (Rus.) Pitel, I. A., I. I. Zolotarev and N. D. Svirda. *Urol. Nefrol.* 36(1):25-31, 1971.

4323 ELECTRON MICROSCOPIC OBSERVATIONS ON THE CEREBELLAR CORTEX IN A CASE OF WILSON'S DISEASE. (Jap.) Ohta, K., Y. Okamoto and O. Honda. *Seishin Shinkeigaku Zasshi (Psychiatr. Neurol. Jap.)* 72(2):157-169, 1970.

See also numbers: 3745, 3827, 3831, 3833, 3837, 3839, 3840, 3844, 3845, 3859, 3862, 4069, 4423

4324 MORPHOLOGICAL ASPECTS OF HEPATITIS INDUCED BY PHENYLBUTAZONE DERIVATIVES. OBSERVATIONS ON TWO CASES. (E.) Coltorti, M. (U. Naples Inst. Spec. Med. Pathol., Italy), L. Cuccurullo and C. Del Vecchio Blanco. *Acta Hepatosplenol. (Stuttg.)* 18(3):206-215, 1971.

Two cases of jaundice induced by treatment with phenylbutazone derivatives were studied. Swelling and microvacuolation of the hepatic cells were common to both cases. In one case there was activation of Kupffer cells, focal necrosis of hepatic cells and mononuclear cell infiltration of the portal triads. In the other case, the basic characteristic was the presence of brown granules in the liver cell cytoplasm indicating a possible bile pigment accumulation. Electron microscopy showed that most of the alterations in the first case occurred at the vascular pole which included dilatation of the Disse spaces with swelling and decrease in the number of microvilli. In the second case, the most important alterations (dilated bile canaliculi, presence of bile pigment resembling material) were seen at the biliary pole. The morphologic findings in the first case correspond to the picture of drug-induced nonspecific hepatitis while those of the second case present evident similarity with the picture of simple intrahepatic cholestasis.

4325 HEPATIC CHANGES IN CHRONIC ALCOHOLIC RATS FOLLOWING PERIODIC ACUTE ALCOHOLIC INTOXICATIONS. (E.) Takeuchi, J. (Kanazawa U. Sch. Med., Japan), A. Takada, Y. Kato, Y. Hasumura, F. Ikegami and Y. Matsuda. *Am. J. Clin. Nutr.* 24(6):628-636, 1971.

The degree of fatty liver and the incidence of intracellular hyalin was greater in the double loading group (chronic and acute alcohol consumption) than in the single loading group (chronic consumption). Hepatic cholesterol, phospholipids, and triglycerides were not significantly different among the groups. During months 3 to 6 of the experiment, plasma GOT activity in the double loading group was significantly higher than that of the other 2 groups. Repeated indulgence of alcohol added to chronic consumption of a moderate amount of alcohol might play an important role in the development of severe hepatic lesions. Also, the semisynthetic (low protein, vitamins) diet group showed more severe fatty liver and more hyaline bodies in the liver than the corresponding commercial diet group. The repeated ingestion of a large amount of alcohol in a short time, together with a relatively low protein diet, enhances the development of hyaline bodies.

4326 ALCOHOLIC STEATONECROSIS. I. RELATIONSHIP BETWEEN SEVERITY OF HEPATIC DISEASE AND PRESENCE OF MALLORY BODIES IN THE LIVER. (E.) Harinasuta, U. and H. J. Zimmerman (150 S. Huntington Ave., Boston, Mass.). *Gastroenterology* 60(6):1036-1046, 1971.

The clinical and biochemical features of hepatic disease and the prognosis of 100 patients whose biopsies showed alcoholic hyalin (Mallory bodies) were compared with those of 157 patients whose biopsies did not show this morphological change but were otherwise qualitatively similar. Features considered typical of alcoholic hepatitis (jaundice, fever and leukocytosis) were significantly more prevalent in the group with Mallory bodies but were also found in the group without alcoholic hyaline. The group without Mallory bodies, however, showed more clinical evidence of portal hypertension (collateral venous pattern of abdominal wall, leukopenia) and histological evidence of more advanced cirrhosis. Values for SGOT, SGPT, bilirubin, and albumin were significantly but only slightly more abnormal, and distinctly abnormal prothrombin values were significantly more prevalent in the group with Mallory bodies. Biopsies with Mallory bodies showed more extensive necrosis and the prevalence of free acidophilic bodies was significantly greater than in the other group.

4327 NATURAL HISTORY OF ALCOHOLIC HEPATITIS. I. THE ACUTE DISEASE. (E.) Lischner, M. W., J. F. Alexander and J. T. Galambos. *Am. J. Dig. Dis.* 16(6):481-494, 1971.

The clinical characteristics and biochemical abnormalities of 169 patients with alcoholic hepatitis diagnosed by liver biopsies according to morphologic criteria which did not require steatosis or alcoholic hepatitis are presented. Sixty-four percent of the patients were women and 36% were men and there was much variation in age (22-80 years). The number of Negro women among the patients was higher than expected, and they acquired their illness at an earlier age than did Caucasian women or men of either race. The most common complaints among these patients were anorexia (77%), nausea and vomiting (55%), abdominal pain (46.1%) and weight loss (43.2%). The most noteworthy physical findings included hepatomegaly (81%), malnutrition (55.6%), jaundice (37.3%), ascites (35%), gastrointestinal bleeding (22.5%), fever in excess of 100.4° (56%), encephalopathy (18%) and esophageal varices (11.8%). Blood studies indicated 43.2% of the patients with hematocrit <30% and in 14.2% it was <20%, while leukocytosis was observed in 34.7% and platelets were normal in 71.6%. Liver biopsies indicated 75% had significant steatosis and 27.2% had septa or cirrhosis. The overall mortality rate for these patients was 4%.

4328 ALCOHOLIC HYALIN AND MEGAMITOCHONDRIA AS SEPARATE AND DISTINCT ENTITIES IN LIVER DISEASE ASSOCIATED WITH ALCOHOLISM. (E.)

Iseri, O. A. (Mallory Inst. Pathol., Boston, Mass.) and L. S. Gottlieb. *Gastroenterology* 60(6):1027-1035, 1971.

The distinguishing features of alcoholic hyalin and "megamitochondria" were determined in liver biopsies taken from 15 patients with liver disease associated with alcoholism using light and electron microscopy. Light microscopy revealed alcoholic hyalin as cytoplasmic inclusions, however, when viewed with an electron microscope at low magnification the hyalin was much less distinct, poorly demarcated, and little fine structure could be appreciated. At higher magnifications the hyalin appeared as aggregates of fibrillar material in random orientation, with no limiting membrane. Megamitochondria, on the other hand, were readily identifiable organelles which occurred in 3 forms: spheroidal, elongated, and irregular. Generally, giant mitochondria were found in a small percentage of the liver cells, and only a few of the mitochondria of a cell were affected.

4329 POSSIBLE MECHANISM OF LIVER NECROSIS CAUSED BY AROMATIC ORGANIC COMPOUNDS. (E.) Brodie, B. B. (Nat. Heart Lung Inst., Bethesda, Md.), W. D. Reid, A. K. Cho, G. Sipes, G. Krishna and J. R. Gillette. *Proc. Natl. Acad. Sci. USA* 68(1):160-164, 1971.

Chemically unreactive bromobenzene (one of a number of chemically inert aromatic hydrocarbons) cannot by itself covalently bind to tissue components, but was found to form a covalent link with in vivo liver macromolecules. The amount of covalently-bound bromobenzene was considerably greater in the necrotic areas than in nonnecrotic areas of the liver. The important role of microsomal enzymes in the activation of aromatic hydrocarbons was emphasized by the fact that the severity of necrosis increased in animals pretreated with phenobarbital. Also the in vitro formation of glutathione conjugates of halogenated hydrocarbons required liver microsomes and was enhanced in microsomes from phenobarbital-treated rats. Apparently the liver can convert stable organic compounds to potent alkylating agents which form covalent bonds with tissue macromolecules.

4330 PLASTICIZERS IN P.V.C. AND THE OCCURRENCE OF HEPATITIS IN A HAEMODIALYSIS UNIT. A PRELIMINARY COMMUNICATION. (E.) Neergaard, J., B. Nielsen (Copenhagen Commun. Hosp., Denmark), V. Faurby, D. H. Christensen and O. F. Nielsen. *Scand. J. Urol. Nephrol.* 5(2):141-145, 1971.

Following the use of a new set of polyvinylchloride blood tubings in hemodialysis, 3 isolated cases of hepatitis were observed within a period of 2 mo. Two patients were shown to have nonspecific hepatitis and viral hepatitis, resp., by liver biopsy. By perfusion with a salt solution, a phthalic acid ester of relatively low molecular weight could be washed out from a polyvinylchloride blood tubing set. The ester, diethylphthalate, could not be washed out by perfusion of 3 other, commercially available, types of blood tubing. Improvement of the condition of 3 patients was observed on resumption of the use of the ordinary dialysis system. Apparently a potential hepatotoxic agent may exude from polyvinylchloride tubings during perfusion and jaundice in hemodialysis patients may be due to a toxic effect upon the liver.

4331 D-GALACTOSAMINE HEPATITIS. I. HEPATOCELLULAR INJURY AND FATTY LIVER FOLLOWING A SINGLE DOSE. (E.) Koff, R. S. (Boston VA Hosp., Mass.), G. Gordon and S. M. Sabesin. *Proc. Soc. Exp. Biol. Med.* 137(2):696-701, 1971.

Following the administration of a single dose of D-galactosamine HCl (1.5 g/kg, i.p.) to rats, hepatocellular injury was manifest, at 6 hr, by the formation of focal areas of cytoplasmic degeneration. These areas consisted of membrane-bound autophagic vacuoles containing remnants of damaged mitochondria, glycogen, fibrillar and granular cellular debris. At 24 hr, there was also evidence of lipid accumulation and the focal cytoplasmic injury had progressed to include large portions of the hepatic lobules which were now completely necrotic and filled with a mixture of amorphous cytoplasmic debris and subcellular organelles in varying stages of degeneration. The early degeneration was paralleled by a progressive increase in SGOT and SGPT levels. At 24 hr, but not at 6 hr, significant hepatic triglyceride accumulation was demonstrated. Animals treated with equimolar D-glucosamine HCl and 2-deoxygalactose remained relatively normal.

4332 DYNAMIC REACTION PATTERN OF THE HEPATIC LYMPH SYSTEM IN RABBITS WITH EXPERIMENTAL ALLERGIC HEPATITIS. (Rus.) Boiko, E. G. (Res. Inst. Human Morphol., Moscow) and B. K. Besprosvanni. *Arkh. Anat. Gistol. Embriol.* 59(12):85-95, 1970.

4333 LOCAL HEPATITIS FROM IRRADIATION. (Sp.) Ortiz Berrocal, J. (Puerta De Hierro, Clin., Madrid, Spain), J. Otero Luna and F. Arnaiz Bueno. *Radiologia (Madr.)* 12(6):707-714, 1970.

4334 TYROSINE METABOLISM IN EXPERIMENTAL TOXIC HEPATITIS. (Rus.) Kontzevaia, N. G. (Med. Inst., Khabarovsk, USSR). *Vopr. Med. Khim.* 17(1):3-6, 1971.

4335 ULTRASTRUCTURAL STUDIES OF THE HEPATIC CHANGES BROUGHT ABOUT BY CLINDAMYCIN

AND ERYTHROMYCIN IN ANIMALS. (E.) Gray, J. E. (Upjohn Co. Res. Labs., Kalamazoo, Mich.), A. Purmalis, B. Purmalis and J. Mathews. *Toxicol. Appl. Pharmacol.* 19(2):217-233, 1971.

4336 ACUTE TOXICITY OF AFLATOXIN B_1 IN MONKEYS. (E.) Suryanarayana Rao, K. (Michigan State U. Dept. Pharmacol., East Lansing) and P. J. Gehring. *Toxicol. Appl. Pharmacol.* 19(2):169-175, 1971.

4337 α-NAPHTHYLISOTHIOCYANATE (ANIT)-INDUCED HEPATOTOXICITY AND DISPOSITION IN VARIOUS SPECIES. (E.) Capizzo, F. (U. Iowa Sch. Med., Oakdale) and R. J. Roberts. *Toxicol. Appl. Pharmacol.* 19(2):176-187, 1971.

4338 THE INFLUENCE OF ANTICOAGULANT THERAPY ON THE DEVELOPMENT OF LIVER CIRRHOSIS FOLLOWING INJURY WITH CCl_4 IN RATS. (Ger.) Grisk, A. (Ernst Moritz Arndt U. Inst. Pharmacol. Toxicol., Greifswald, Germany) and G. Hegewald. *Acta Biol. Med. Ger.* 25(5-6):883-890, 1970.

4339 A MODEL OF HEXACHLOROBENZENE-INDUCED EXPERIMENTAL LIVER PORPHYRIA. (Bul.) Ivanov, E. and P. Dimitrov. *Dermatol. Venerol. (Sofiia)* 9(4):200-206, 1970.

4340 A STUDY OF THE FACTORS AFFECTING BARBITURATE LEVELS IN POSTMORTEM LIVERS. (E.) Moghrabi, H. M. (Univ. Med. Coll. Hosp., London) and S. Currya. *Jordan Med. J.* 5(2):181-187, 1970.

See also number: 3603

ACUTE VIRAL HEPATITIS

4341 THE PATHOGENESIS OF ARTHRITIS ASSOCIATED WITH VIRAL HEPATITIS. COMPLEMENT-COMPONENT STUDIES. (E.) Alpert, E. (Massachusetts Gen. Hosp., Boston), K. J. Isselbacher and P. H. Schur. *N. Engl. J. Med.* 285(4):185-189, 1971.

A group of 18 patients with acute viral hepatitis had initial symptoms of arthralgia, arthritis or urticaria. Total serum hemolytic complement (CH_{50}) was abnormally low in 8 of 9 patients studied in the acute phase of the joint symptoms. The C1q protein concentrations varied widely, the C3 concentrations were low normal to markedly depressed and the C4 concentrations were the most strikingly abnormal with severe depression in 8 of the 9 patients. High hepatitis-associated antigen titers was associated with low complement levels. Patients with acute nonviral hepatitis had normal or elevated total serum hemolytic complement. CH_{50}, C1q and C3 levels were either normal or elevated in patients with viral hepatitis with no history of joint or skin symptoms. A similar picture was seen in patients with viral hepatitis with arthritis or urticaria in convalescence or remission. This "serum sickness" may be caused by circulating immune complexes.

4342 AUSTRALIA ANTIGEN IN HEPATITIS AMONG SWEDISH TRACT-FINDERS. (E.) Berg, R. (State Bacteria Lab., Stockholm, Sweden), O. Ringertz and A. Espmark. *Acta Pathol. Microbiol. Scand.* [*B*] 79(3):423-427, 1971.

In 69 Swedish cross-country tract finders with hepatitis, positive reactions for Australia antigen were seen in 32 (46%). The antigen was found in all sera taken within 9 days after onset of illness, and the frequency gradually decreased with increasing time. The antigen was not found in any of 14 sera taken later than 54 days after onset of illness. In paired sera most titers seemed to fall from high values to low or negative values within about 3 weeks. That the disease among the Swedish track-finders was a serum hepatitis was supported. Present data does not include any conclusions concerning the frequency of a possible carrier state following hepatitis in track-finders.

4343 ARTHRITIS OF HEPATITIS ASSOCIATED WITH AUSTRALIA ANTIGEN. (E.) Onion, D. K. (VA Hosp., Seattle, Wash.), C. S. Crumpacker and B. C. Gilliland. *Ann. Intern. Med.* 75(1):29-33, 1971.

The clinical presentation of 3 patients with arthritis and rash led to the initial admitting diagnosis of acute rheumatoid arthritis, acute rheumatic fever or systemic lupus erythematosus. The sera of these patients contained Australia antigen and depressed complement levels when hepatitis was not yet apparent and arthritis was the predominant clinical finding. In the sera of 2 patients Australia antigen disappeared, Australia antibody appeared and complement returned to normal levels. These immunologic data, us the clinical manifestations of arthritis and sh, are strikingly analogous to those observed serum sickness and systemic lupus. Australia tigen was also found in synovial fluid indicating at this antigen can enter the synovial space. the Australia antigen is a viral antigen, the thritis and perhaps other manifestations of stralia antigen-positive hepatitis may be an ample of immune complex disease caused by a rus.

44 VIRAL HEPATITIS, TYPE B (MS-2 STRAIN). STUDIES ON ACTIVE IMMUNIZATION. (E.) ugman, S. (New York U. Sch. Med., N. Y.), J. P. les and J. Hammond. *JAMA* 217(1):41-45, 1971.

ral hepatitis, type B (MS-2 strain) was pre-ented in children by active immunization which s induced by the inoculation of an inactivated oiled) preparation of MS-2 serum in distilled ter. Two inoculations were more effective than e. The absence of hepatitis in all 4 susceptible ildren who received 2 in oculations of boiled -2 serum and its absence in 4 of 10 who received inoculation was impressive when compared with a -100% attack rate in 25 susceptible children o received MS-2 without previous active immuni-ation. Inactivated MS-2 serum resembled in-ctivated poliovaccine or influenza vaccine which ve the capacity to prevent or modify an infection. ther inactivated vaccines like measles and spiratory syncytial virus sensitize rather an protect recipients of the vaccine.

345 DETECTION OF AUSTRALIA ANTIGEN BY RADIOIMMUNOASSAY. (E.) Aach, R. D. Washington U. Sch. Med., St. Louis, Mo.), J. W. risham and C. W. Parker. *Proc. Natl. Acad. Sci. SA* 68(5):1056-1060, 1971.

double antibody radioimmunoassay for the etection of Australia antigen and antibodies to ustralia antigen in human sera was described. he assay utilizes ^{125}I-labeled Au antigen, uinea pig anti-Au antibody (the first antibody), nd rabbit serum with antibodies to guinea pig -globulin (second antibody). Australia antigen r anti-Au antibody was demonstrated in the sera f 22 of 23 patients with parentally transmitted epatitis, including 7 who were Au-antigen egative by less sensitive techniques. This ouble antibody radioimmunoassay is approximately 000 times more sensitive than agar gel diffusion nd 200 times more sensitive than quantitative omplement fixation. The assay can be completed ithin 18 hr, which makes it an effective method for routine screening of donor blood for Australia ntigen, except in emergency conditions.

346 ERGASTERIC HEPATITIS: ENDEMIC HEPATITIS ASSOCIATED WITH AUSTRALIA ANTIGEN IN A RESEARCH LABORATORY. (E.) Sutnick, A. I. (Inst. Cancer Res., Philadelphia, Pa.), W. T. London, I. Millman, B. J. S. Gerstely and B. S. Blumberg. *Ann. Intern. Med.* 75(1):35-40, 1971.

Four cases of acute viral hepatitis were found among laboratory and clinical personnel engaged in the study of Australia antigen. All 4 had Australia antigen in their serum, and in 3 the antigen was detected for only 1 or 2 days when they first became symptomatic. Fifteen additional individuals had transaminase rises of 30-200 Karmen units/100 ml, which may represent episodes of acute anicteric hepatitis. These 19 definite and suspected cases occurred among 56 people, whose SGPT was tested 5 to 32 times. Eight staff members had transient SGPT elevations. This laboratory-acquired infection was termed ergasteric (from the Greek:laboratory) hepatitis. It is suggested that personnel of research laboratories working with Australia antigen or any human blood or tissue should be monitored for Australia antigen and SGPT levels.

4347 SPECIFIC ANTIBODY RESPONSE AFTER TRANSFUSION OF AUSTRALIA ANTIGEN-POSITIVE BLOOD IN A PATIENT WITH LIVER CIRRHOSIS. (E.) Ulstrup, J. C. (Ulleval Hosp., Oslo, Norway), J. Myren and A. E. Stenwig. *Scand. J. Infect. Dis.* 3(1):79-81, 1971.

A diagnosis of liver cirrhosis in a 70-yr-old man was followed shortly thereafter by readmission of this patient with hematemesis and melena. During 10 days he received 23 transfusions of blood and 5 of plasma. The blood of the first transfusion was afterwards found to be strongly Australia antigen positive. Following this transfusion the patients' temperature, SGOT value, serum bilirubin and thymol turbidity all rose. Antibody to Australia antigen, of the IgG type, was demonstrated 1 month after transfusion. The titer of antibodies (anti-Au) decreased thereafter and signs of acute hepatitis disappeared. The patient subsequently died from a second hemorrhage and at autopsy was found to have hepatic cirrhosis. A secondary immune response would indicate that the liver cirrhosis was due to a chronic infection with the long incubation type hepatitis virus.

4348 SERUM HEPATITIS ANTIGEN (SH) CARRIER STATE: RELATION TO ABO BLOOD GROUPS. (E.) Szmuness, W. (New York Blood Ctr., N. Y.), A. M. Prince and C. E. Cherubin. *Br. Med. J.* 2(5755):198-199, 1971.

The association between blood groups and susceptibility to serum hepatitis is studied by comparing the blood group distribution in carriers of the SH antigen (Australia) and appropriately matched controls. In both the donor series and the mentally retarded series the ABO blood distribution was the same or nearly the same in carriers of the SH antigen and the noncarriers. In mentally retarded Negro SH antigen carriers there was an apparent excess of group A and deficiency of group O, and in the carriers with Down's syndrome there was an excess of group O. When suffiently large samples are tested, there seems to be no significant difference in the ABO blood group distribution among carriers of the SH antigen and noncarriers.

4349 NATURE OF CELL INJURY BY MURINE HEPATITIS VIRUS (MHV3). (E.) Piplani, S. K. (Postgrad. Inst. Med. Ed. Res., Chandigarh, India) and B. K. Aikat. *Indian J. Med. Res.* 58(11): 1536-1545, 1970.

Young VCR and Swiss mice were administered a single i.p. injection of 100 LD_{50} of a suspension of murine hepatitis virus (MHV3) and were sacrificed 6-96 hr after this challenge. At 6 hr, the Kupffer cells appeared swollen with eosinophilic cytoplasm and pyknotic nuclei and the parenchymal cells showed loss of basophilia. By 18-24 hr, there was further damage with areas of liver cell necrosis with nuclear pyknosis, karyorrhexis and karyolysis and the Kupffer cells were swollen with diffusely eosinophilic cytoplasm. At 48-96 hr, the period of maximum mortality, there were extensive areas of eosinophilic necrosis, with eosinophilic hyaline bodies lying free in the sinusoids, parenchymal cells and Kupffer cells. The Kupffer cell acid phosphatase was found to increase in activity and distribution with evolving injury. Parenchymal cell isocitric dehydrogenase was markedly increased at 6 hr but had all but disappeared by 24 hr. Parenchymal cell surfaces failed to show calcium until after 18 hr. In in vitro studies on mouse peritoneal macrophages at 6 hr there was occasional rounding and clumping of cells with pyknotic nuclei while at 24 hr typical syncytia formation was seen in focal areas with nuclear pyknosis, karyorrhexis and karyolysis evident within the syncytia. With further injury, there was detachment of syncytia from the glass with eventual rounding of individual cells. Enzyme determinations on tissue culture fluid revealed the classical pattern for acid phosphatase, isocitric dehydrogenase and the glutamic transaminases.

4350 HEPATITIS AND AUSTRALIA ANTIGEN. (Gr.) Schizas, N., A. Yiannitsiotis and D. Demertzis. *Hellen. Armed Forces Med. Rev. (Hafma)* 4(6):769-775, 1970.

4351 REPORT ON HEPATITIS EPIDEMIC IN CHILDREN. (Ger.) Strambach, S. (Sandgasse 5a, Roth, Germany). *Med. Welt* 22(1):29-31, 1971.

4352 A STUDY OF THE PRESENCE OF THE Au ANTIGEN (SERUM HEPATITIS, SH ANTIGEN) AND ANTIBODIES AGAINST THE Au ANTIGEN IN DONOR AND PATIENT SERUM. (Dut.) Brummelhuis, H. G. J. (Netherlands Red Cross Blood Transfus. Lab., Amsterdam). *Ned. Tijdschr. Geneeskd.* 115(5): 181-185, 1971.

4353 THE DIAGNOSTIC AND CLINICAL IMPORTANCE OF THE EXCRETION OF NEUTRAL 17-KETOSTEROIDS IN INFECTIOUS HEPATITIS IN CHILDREN. (Rus.) Povarekho, I. A. *Zdravookhr. Beloruss.* 15(12):34-36, 1970.

4354 AUSTRALIA ANTIGEN: THE VIRUS OF HEPATITIS? (It.) Rossi, M. *Ann. Sanit. Pubbl.* 31(1):3-11, 1970.

4355 RENAL HEMODIALYSIS AND THE AUSTRALIA ANTIGEN. SIMULTANEOUS DEMONSTRATION OF THE ANTIGEN AND THE CORRESPONDING ANTIBODY IN THE SAME PATIENT. (Fr.) Bagros, P. (CHU Blood Transfus. Ctr., Tours, France), P. Maupas and A. Audurier. *J. Urol. Nephrol.* 76(12):1042-1046, 1970.

4356 AN EPIDEMIOLOGIC EVALUATION OF THE SEQUELAE OF VIRAL HEPATITIS. (Pol.) Magdzik, W. (State Epidemiol. Inst., Warsaw, Poland). *Przegl. Epidemiol.* 24(4):453-461, 1970.

4357 THE VITAMIN C BALANCE IN VIRAL HEPATITIS. (Pol.) Rokicki, W. (Med. Acad. Dept. Gen. Pathol., Cracow, Poland) and J. Sowa. *Przegl. Lek.* 27, Pt. 2(12):893-896, 1970.

4358 SCREENING OF DONORS FOR THE AUSTRALIAN ANTIGEN. (Hun.) Penke, Z. (Natl. Hematol. Inst., Budapest, Hungary), Z. Koszeghy and E. Novak. *Transfusio (Budapest)* 4(4):103-104, 1970.

4359 CONTROL OF INFECTIOUS HEPATITIS IN DIALYSIS CENTERS. (It.) Costantino, D. (U. Milan 2nd Inst. Clin. Med., Italy), S. Del Prete and M. Doglia. *Minerva Nefrol.* 17(6):204-207, 1970.

4360 OBSERVATIONS ON THE BEHAVIOR OF PROTEINURIA DURING ACUTE INFECTIOUS HEPATITIS. (It.) Menghi, P. (U. Sassari Inst. Clin. Pediatr., Italy), G. Camerini and A. Dore. *Pediatria (Napoli)* 78(4):676-683, 1970.

4361 CYTOGENETIC INVESTIGATION OF LEUKOCYTES FROM BLOOD OF VIRAL HEPATITIS PATIENTS AND OF DONORS. (Rus.) Dementev, I. V. (D. I. Ivanovskii Inst. Virol., Moscow), I. F. Barinskii, I. V. Shakhgildian and V. P. Belikova. *Genetika* 6(10):133-141, 1970.

62 COMPARATIVE STUDIES ON THE AUSTRALIA ANTIGEN AND THE VIRUSES ISOLATED FROM EPATITIS PATIENTS. (Rum.) Laszlo, I. (Inst. armaceut Med., Tirgu Mures, Rumania), S. nteanu, V. Filep and L. Kasza. *Rev. Med. irgu Mures)* 16(3-4):337-340, 1970.

63 AN ELECTRON MICROSCOPIC STUDY OF HUMAN ACUTE HEPATITIS. (E.) Sakamoto, S. apporo Med. Coll., Japan). *Sapporo Igaku sshi (Sapporo Med. J.)* 37(6):205-239, 1970.

64 RESULTS OF ADMINISTRATION OF A LARGE ORAL DOSE OF PARACETAMOL TO CHILDREN ITH INFECTIOUS HEPATITIS. (Ger.) Gmyrek, D. Humboldt U. Dept. Med., Berlin) and G. Klimmt. *tsch. Gesundheitsw.* 26(11):503-508, 1971.

365 INVESTIGATION OF THE SERUM LEVEL OF FOLIC ACID IN PATIENTS WITH VIRAL EPATITIS. (Pol.) Tkaczewski, W. (Med. Acad. nfect. Dis. Clin., Lodz, Poland), H. Niedzielska nd E. Malafiej. *Pol. Tyg. Lek.* 26(1):10-12, 971.

366 HEPATITIS AND HEPATITIS ASSOCIATED ANTIGEN (HAA) IN DANISH DIALYSIS CENTERS. Dan.) Skinhoj, P. (Bispebjerg Hosp., Copenhagen, enmark) and I. Steiness. *Ugeskr. Laeger.* 33(6):240-243, 1971.

367 LEGISLATION DEMANDING THE COMPULSORY REGISTRATION OF CASES OF INFECTIOUS EPATITIS. (Fr.) Boyer, J. *Bull. Acad. Natl. ed. (Paris)* 154(32-33):810-813, 1970.

368 VALUE OF SOME SERUM ENZYME TESTS IN THE DIFFERENTIAL DIAGNOSIS OF INFECTIOUS EPATITIS. (Fr.) Franche, M. (Inst. Med., assy, Rumania). A. Vata and P. Blindu. *Arch. n. Med. Balkan. (Buc.)* 8(3):213-216, 1970.

4369 VIRAL HEPATITIS ASSOCIATED ANTIGENS. (Sp.) Morgante, P. E. *Acta Gastroenterol. Lat. Am.* 2(4):209-212, 1970.

4370 THE EFFECT OF A POLYENE PHOSPHATIDYL CHOLINE-CONTAINING DRUG ON ACUTE INFECTIOUS HEPATITIS. (Jap.) Suga, S. (Nagoya Natl. Hosp., Japan). *Nippon Shokakibyo Gakkai Zasshi (Jap. J. Gastroenterol.)* 67(12):1142-1151, 1970.

4371 AN EPIDEMIOLOGICAL STUDY OF INFECTIOUS HEPATITIS IN OBATAKE VILLAGE, YAMAGUCHI PREFECTURE, FROM 1965 TO 1969. (Jap.) Iwahara, S., G. Yamada, Y. Samura and M. Ogawa. *Nippon Densenbyo Gakkai Zasshi (J. Jap. Assoc. Infect. Dis.)* 44(6):331-339, 1970.

4372 IMMUNOGLOBULIN ASSAY IN ACUTE HEPATITIS. (Hun.) Prekopa, A. (Med. U., Debrecen, Hungary), L. Dalmi and R. Zayzon. *Orv. Hetil.* 111(51):3015-3017, 1970.

4373 THE SIGNIFICANCE OF THE AUSTRALIA ANTIGEN FOR THE DIAGNOSIS OF LIVER DISEASES. (Ger.) Dolle, W. (Univ Med. Clin., Marburg/L., Germany). *Dtsch. Med. Wochenschr.* 96(6):257-258, 1971.

4374 SEROEPIDEMIOLOGICAL STUDIES OF TRANSFUSION-ASSOCIATED HEPATITIS. (E.) Purcell, R. H. (Natl. Inst. Allergy Infect. Dis., Bethesda, Md.), J. H. Walsh and P. V. Holland. *J. Infect. Dis.* 123(4):406-413, 1971.

4375 AUSTRALIA ANTIGEN IN ACUTE HEPATITIS IN MELBOURNE. (E.) Gust, I. D. (Fairfield Hosp. Communic. Dis., Victoria, Australia) and C. R. Lucas. *Med. J. Aust.* 1(5): 260-262, 1971.

4376 AUSTRALIA ANTIGEN IN ACUTE AND CHRONIC HEPATITIS. (Ger.) Grob, P. J. (Univ. Med. Clin., Zurich, Switzerland), H. J. Jemelka and J. W. Muller. *Praxis* 60(8):230-237, 1971.

See also numbers: 4261, 4270

4377 B_1A AND SH ANTIGEN IN CHRONIC HEPATITIS. (E.) Grob, P. J. (Canton Hosp., Zurich, Switzerland), H. J. Jemelka and J. W. Müller. *Gastroenterology* 61(1):91-95, 1971.

The mean values for B_1A (a constituent of the third component of complement serum hepatitis) of the 2 groups with chronic aggressive and chronic persisting hepatitis were significantly lower than those for the control group. Patients with acute hepatitis more often had increased (33%) as well as decreased (20%) B_1A levels than did healthy persons. SH antigen was present in 41% of patients with chronic aggressive hepatitis and these patients had a distinct tendency to have lower B_1A values when compared to SH negative patients. The same tendency was evident in the chronic persistent hepatitis group. Half of the patients with acute hepatitis were positive for the SH antigen. Antinuclear antibodies were found in 30% of the chronic aggressive hepatitis patients. There was no relation between B, A and immunoglobulins, which were increased in more than half of the patients with chronic hepatitis. Persistent low levels of complement after an acute hepatitis may allow prediction of the development of chronic disease.

4378 STUDIES ON THE MACROMOLECULAR CHANGES OF THE INTRALOBULAR CONNECTIVE TISSUE IN CHRONIC VIRAL HEPATITIS. (E.) Velican, D. (N. G. Lupu Inst. Intern. Med., Bucharest, Rumania) and C. Velican. *Rev. Roum. Med. Interne* 8(2): 111-118, 1971.

In patients with chronic viral hepatitis, an abnormal barrier occurred between liver parenchymal cells and blood. It was characterized histochemically by a progressive disappearance of the reactivity of lipids and progressive increase of the affinity for those staining methods that reveal noncollagen proteins. In addition, a strengthening of the linkages between macromolecules in the reticular networks seemed to take place. The appearance of an abnormal basement membrane, detected by both histochemical and previous electron microscopic observations, might induce the conversion of an open intralobular circulation into a closed one. This could represent an important mechanism leading to hepatocellular insufficiency and even to severe damage and necrosis. Changed reticular framework with its capacity to stimulate collagen fibril aggregation into the glycoprotein matrix may be prevented by factors that would act as potential antifibrilogenetic agents.

4379 CHRONIC ACTIVE HEPATITIS. REPORT OF TWO SISTERS WITH POSITIVE LUPUS ERYTHEMATOSUS PREPARATIONS. (E.) Hilberg, R. W. (Mercy Hosp., Pittsburgh, Pa.), L. M. Mulhern, J. J. Kenny and F. J. Luparello. *Ann. Intern. Med.* 74(6):937-941, 1971.

Both cases fulfilled the diagnostic criteria for chronic active hepatitis. The patients were previously healthy young girls with onset of hepatitis at age 15 yr. One patient exhibited a progressive unrelenting course until death 32 months after clinical onset. The above patient's sister has shown smouldering active disease marked by persistent SGOT elevations over a 2.5-yr period. Both patients demonstrated marked hypergammaglobulinemia and strongly positive lupus erythematosus preparations. In neither case was there evidence for a coincident or underlying connective tissue disorder, and neither patient showed Australia antigen (agar-gel precipitation test). Whether such markers (Australia antigen) are of value either diagnostically or prognostically is presently speculative.

4380 HERPES ZOSTER AND CHRONIC ACTIVE HEPATITIS. (E.) Rosenfield, A. T., D. R. Schermer, J. M. Gospe and R. A. Hartley. *Am. J. Dig. Dis.* 16(6):535-539, 1971.

Two patients with chronic active hepatitis who developed simultaneous herpes zoster are presented. In both cases, the clinical onset of herpes zoster occurred at a time when the liver disease was particularly active. In one case, however, liver function tests worsened during the episode of zoster. Both patients had zoster which involved separate dermatomes at the same time or at different times. This type of involvement is seen most frequently in patients with an immune tolerance. Although one of the patients was receiving systemic steroids at the time of onset of the herpes infection, the other patient was not receiving any medication which was likely to disturb immune responses.

4381 DYSFUNCTIONAL CORRELATIONS IN CHRONIC HEPATITIS. THE SIGNIFICANCE OF LESIONAL 'ASYNCHRONISM AND ASYMMETRY' AND CERTAIN DISCREPANCIES IN FUNCTIONAL BIOCHEMICAL LIVER TESTS. (Rum.) Fodor, O. (Inst. Public Health Med. Res., Cluj, Rumania) and F. Barbarino. *Med. Interna (Bucur.)* 23(5):545-563, 1971.

4382 AGGRESSIVE CHRONIC HEPATITIS. (Sp.) Díaz-Rubio García, M. (Sch. Med., Madrid, Spain) and L. Enríquez. *Rev. Esp. Enferm. Apar. Dig.* 34(4):329-350, 1971.

4383 A CASE OF WALDENSTROM'S PURPURA HYPERGLOBULINEMIA IN CHRONIC HEPATITIS WITH EXACERBATIONS. (Ger.) Escher, J. (Solothurn Hosp., Switzerland), P. Righetti and D. Jaeger. *Schweiz. Med. Wochenschr.* 100(46): 2004-2005, 1970.

4384 EXPERIMENTAL OBSERVATIONS ON CHANGES IN RENAL FUNCTION AND ACID BASE BALANCE IN CHRONIC LIVER DISEASES. (It.) Agnoli, G. C. (Univ. Inst. Clin. Med., Bologna, Italy), P. Bernardi, A. Cariani and T. Montini. *Boll. Soc. Ital. Biol. Sper.* 45(23):1511-1515, 1970.

4385 CURRENT VIEWS ON CHRONIC HEPATITIS AND CIRRHOSIS OF THE LIVER. (Rus.) Loginov, A. S. *Klin. Med. (Mosk.)* 49(2):4-13, 1971.

CIRRHOSIS

4386 LIVER BIOPSY IN METHOTREXATE TREATMENT. (E.) Zachariac, H. (Natl. Hosp., Copenhagen, Denmark) and T. Schiødt. *Acta Derm. Venereol. (Stockh.)* 51(3):215-220, 1971.

Fatty changes of the liver were found in a large number of patients with psoriasis, liver steatosis being related to alcohol abuse or obesity in some of these patients. Hepatic steatosis was not found in a higher degree in methotrexate-treated patients than in the group considered for methotrexate treatment. Focal necrosis was found with equal frequency in psoriatics with and without methotrexate; hence this pathologic finding together with periportal and parenchymous inflammation may be related to the disease rather than to the treatment. No cases of definite cirrhosis were observed. All patients on methotrexate displayed elevated SGPT, demonstrating this rise as an almost normal finding during methotrexate treatment. The lack of correlation between increase in SGPT and pathological liver biopsy shows the limitations of these investigative procedures when performed alone. SGPT does not seem reliable in the evaluation of hepatic toxicity of a slow, chronic nature.

4287 EFFECTS OF OESTROGENS ON SERUM THYROXINE-BINDING GLOBULIN CAPACITY AND ON THE PERIPHERAL METABOLISM OF THYROXINE IN PATIENTS WITH HEPATIC CIRRHOSIS. (E.) Zaninovich, A. A. (Jose de San Martin Hosp., Buenos Aires, Argentina), O. Degrossi and H. Gotta. *Acta Endocrinol. (Kbh.)* 67(1):73-84, 1971.

In vitro, the mean control thyroxine binding globulin capacity in cirrhosis, within the normal range of noncirrhotic subjects, was significantly increased following administration of estrogens. Unlike that of normal subjects, the increased thyroxine-binding globulin capacity in cirrhotic patients did not prolong the T_4 half time. Although the fractional turnover rate was relatively unchanged, estrogens decreased the distribution space from 8.4 to 7.6 liters. Despite these changes, the clearance rate was not grossly altered due to the reciprocal variation of the fractional T_4 turnover. The extrathyroidal T_4 pool varied little and as a result of these changes, the daily degradation rate of T_4 increased slightly but not significantly. In cirrhosis the site of thyroxine-binding globulin production apparently does not function at its maximum capacity.

4388 HEPATIC LOBAR DISTRIBUTION OF SPLENIC AND MESENTERIC BLOOD FLOW IN MAN. (E.) Groszmann, R. J., B. Kotelanski and J. N. Cohn (VA Hosp., Washington, D. C.). *Gastroenterology* 60(6):1047-1052, 1971.

The lobar distribution of portal blood flow was studied in 6 normal subjects and 8 patients with portal hypertension using ^{131}I-labeled serum albumin. Injection into either the superior mesenteric or splenic artery elicited similar isotope dilution curves in the right and left hepatic veins. Areas of the curves of right and left hepatic veins did not differ between normal and cirrhotic subjects whether injection was into the splenic or superior mesenteric artery. There appears to be no consistent pattern of selective distribution to the liver of splenic and mesenteric blood flow in man.

4389 CIRRHOSIS IN CHILDREN FROM PEANUT MEAL CONTAMINATED BY AFLATOXIN. (E.) Amla, I. (Mysore Med. Coll., India), C. S. Kamala, G. S. Gopalakrishna, A. P. Jayaraf, V. Sreenivasamurthy and H. A. B. Parpia. *Am. J. Clin. Nutr.* 24(6):609-614, 1971.

Most children suffering from varying degrees of protein-calorie malnutrition, and who had consumed aflatoxin-contaminated, low fat, commercially produced peanut protein flour showed some type of hepatomegaly. Liver biopsy at 1-2 months revealed moderate to severe fatty infiltration without any changes in the lobular architecture and the presence of an inflammatory exudate extending into the hepatic parenchyma. At 4 months, biopsy showed fibrous tissue appearing from the portal tract and infiltrating into surrounding parenchyma followed by severe cellular infiltration in which perilobular fibrosis was seen frequently. At 10 months, a complete abolition of the lobular architecture with dissection of septa of varying thicknesses was observed. Typical regenerative nodules were not seen. These hepatic lesions (fibrosis and cirrhosis) do not usually occur in treated kwashiorkor and are identical to Indian childhood cirrhosis.

4390 INHIBITION OF PHA-STIMULATED LYMPHOCYTE TRANSFORMATION BY PLASMA FROM PATIENTS WITH ADVANCED ALCOHOLIC CIRRHOSIS. (E.) Hsu, C. C. S. (Mt. Sinai Sch. Med., New York, N. Y.) and C. M. Leevy. *Clin. Exp. Immunol.* 8(5):749-760, 1971.

Lymphocytes from patients with cirrhosis responded to phytohemagglutinin (PHA) to the same degree as lymphocytes from healthy controls. PHA produced a 170% stimulation of lymphocytes cultured in plasma from healthy controls, whereas it only produced a 14% stimulation of lymphocytes cultured in plasma from alcoholic cirrhotic patients. Heating the cirrhotic plasma at 56° C for 60 min produced an increase in lymphocyte stimulation. The inhibitory factor(s) in cirrhotic plasma was not affected by freezing and thawing for up to 16 cycles or by incubating in 37° C for up to 5 days. The lymphocytic response was suppressed by plasma from a patient with viral hepatitis without a positive test for hepatitis-associated antigen. Plasma from 2 patients with extrahepatic biliary obstruction did not exhibit a blocking effect, while plasma from the patients with metastatic adenocarcinoma, granulomatous hepatitis, uremia and allergic rhinitis did exhibit such an effect. The magnitude of blocking effects in all of these conditions was negatively correlated with the serum γ-globulin levels.

4391 EXPERIMENTAL HEPATIC CIRRHOSIS IN DOGS CAUSED BY CHRONIC MASSIVE IRON OVERLOAD. (E.) Lisboa, P. E. (Univ. Hosp. Santa Maria, Lisbon, Portugal). *Gut* 12(5):363-368, 1971.

Of 19 dogs who received massive parenteral iron loading with i.v. iron-dextran and i.m. iron-sorbitol, 6 dogs survived for 35 to 47 months. Five of the 6 developed cirrhosis, their livers became markedly enlarged and granular and a superficial collateral circulation developed. Liver histology showed disorganization of lobular architecture, with nodular regeneration, slight fibrosis, and mild inconstant mononuclear infiltration. Massive deposits of iron were found in the parenchyma though siderosis was almost absent in the newly regenerated cells of pseudo-lobules. Most of the animals tolerated the massive doses of iron well. The liver injury produced by massive iron loading in dogs resembles that of human hemochromatosis in the sequence of heavy siderosis, followed by portal fibrosis and cirrhosis, with only slight inflammation.

4392 DELAYED HYPERSENSITIVITY IN ALCOHOLIC CIRRHOSIS. (E.) Straus, B. (Beth Israel Med. Ctr., New York, N. Y.), M. R. Berenyi, J.-M. Huang and E. Straus. *Am. J. Dig. Dis.* 16(6):509-516, 1971.

The delayed hypersensitivity reaction was studied in 50 patients with alcoholic cirrhosis by administering the following dermal antigens, 2,4-dinitro-1-chlorobenzene (DNCB), purified protein derivative (tuberculin; PPD), histoplasmin, streptokinase-streptodornase, coccidioidin and candida to determine the role of this reaction in the increased susceptibility to infection found in this disease. Only 68% of the patients reacted positively to DNCB whereas 95% of the control subjects were positive. Forty-six percent of the patients had positive reactions to streptokinase-streptodornase, as contrasted to 68% of the controls. The reactions to coccidioidin and histoplasmin were the same in both groups. While 50% of the controls were positive when tested with PPD, 62% of the cirrhosis patients reacted. Thirty one of the 50 patients had significant infections. A partial impairment of the delayed hypersensitivity reaction in some patients with alcoholic cirrhosis, and complete impairment to these antigens in a few cases seemingly accounts for some of the observed increases in infection rates.

4393 REDUCTION OF PORTAL HYPERTENSION BY GANGLIONIC BLOCKADE. (E.) Cincotti, J. and R. P. Huemer (VA Hosp., Sepulveda, Calif.). *Am. J. Dig. Dis.* 16(6):517-521, 1971.

Changes in portal venous and systemic arterial pressure induced by trimethaphan camsylate (a ganglionic blocking agent) were measured during splenic-pulp manometry in 58 cirrhotic patients with esophageal varices, intractable ascites or both. Mean decreases of 13.4 ± 4.5 cm H_2O (31.3%) in portal pressure and 48.1 ± 14.9 mm Hg (39.4%) in arterial pressure were observed. The degree of fall in portal and arterial pressure were correlated with the initial pressure readings (r = 0.542 and 0.429, resp.). The corrected splenic-pulp pressure was above 30 cm of saline in 50 cases, and was greater than 40 cm in 42 of these. In 40% of the second group, the presence of gastroesophageal varices or fugal flow was confirmed by splenoportography.

4394 CIRRHOSIS OF THE LIVER. A COMPARATIVE STUDY OF THE FOUR MAJOR AETIOLOGICAL GROUPS. (E.) Powell, L. W. (U. Queensland Dept. Med., Brisbane, Australia), R. Mortimer and O. D. Harris. *Med. J. Aust.* 1(18):941-950, 1971.

ne incidence of the 4 most common causes of epatic cirrhosis in 414 patients was alcoholic irrhosis, 35.3%; cryptogenic cirrhosis, 21.2%; emochromatosis, 10.9% and active chronic epatitis, 7.7%. Although these etiological roups differed in sex incidence, symptoms and igns, pathological features, associated diseases, nd complications, there was little difference n the incidence of hepatocellular failure and ortal hypertension between alcoholic and ryptogenic patients. Surgery for gastrointestinal emorrhage, which occurred in about 33% of atients in each group except those with hemohromatosis, was performed in only 18 cases. rimary liver cell carcinoma accounted for a 9.1, 0.6 and 36.3% mortality in patients with alcohol irrhosis, cryptogenic cirrhosis and hemochromatosis, esp. Although an important cause of prolonged orbidity and frequent hospitalization, cirrhosis f the liver should not be regarded as a chronic, rreversible disease with a uniformly poor rognosis.

395 COLLOID OSMOTIC PRESSURE IN HEPATIC CIRRHOSIS AND EXPERIMENTAL ASCITES. E.) Witte, C. L. (U. Arizona Coll. Med., Tucson), . H. Witte, K. Kintner, W. R. Cole and A. E. umont. *Surg. Gynecol. Obstet.* 133(1):65-71, 1971.

issue osmotic pressure in the splanchnic bed was harply reduced in dogs and patients with marked ortal hypertension with, and without ascites. lthough the plasma osmotic pressure decreased, he osmotic pressure gradient was greater than ormal. Tissue osmotic pressure also fell in the cirrhotic liver and a relatively large osmotic ressure gradient developed across the normally freely permeable hepatic sinusoid. In patients with cirrhosis, the elevation of portal pressure, reduction in absolute pressure, and increase in effective plasma osmotic pressure in the hepatosplanchnic bed were similar in those with and without ascites. Also, the balance of intravascular and pericapillary physical forces uniformly promote increased lymph formation in this disease. Thus, the critical limiting factor in the development of ascites in cirrhosis may lie in the varying capacity of the lymph circulation to drain off this excess capillary filtrate.

4396 CHANGES IN BLOOD AND RESPIRATORY CONSTANTS DURING LIVER CIRRHOSIS BEFORE AND AFTER PORTACAVAL ANASTOMOSIS. (Fr.) Verdier, F. (Beaujon Hosp., Clichy, France), B. Rueff and P. Drutel. *Pathol. Biol. (Paris)* 19(1-2):43-48, 1971.

4397 DIAGNOSIS OF CIRRHOSIS OF THE LIVER IN CHILDREN. (Ger.) Cihula, J. (Univ. Pediatr. Clin., Hradec Kralove, Czechoslovakia) and V. Vortel. *SB. Ved. Praci Lek. Fak. Karlovy Univ.* 13(1):27-34, 1970.

4398 CLEARANCE OF ETHANOL AND ITS RELATION TO HEPATIC BLOOD FLOW IN NORMAL AND IN CIRRHOTIC SUBJECTS. (It.) Canonico, A. (Univ. Inst. Med. Pathol., Palermo, Italy), L. Mancuso and F. Rinaldi. *Boll. Soc. Ital. Biol. Sper.* 45(23):1488-1490, 1970.

4399 PEPTIC ULCER IN LIVER CIRRHOSIS WITH DIGESTIVE TRACT HEMORRHAGE. RADIOLOGICAL STUDY. (Fr.) Nahum, H. (Beaujon Hosp., Clichy, France), B. Rueff and G. Cazard. *Presse Med.* 78(55):2491-2494, 1970.

4400 EMERGENCY PORTAL DECOMPRESSION. A REVIEW OF 31 PATIENTS OPERATED UPON VIA A MIDLINE APPROACH. (E.) Baird, R. J. (Toronto Western Hosp., Ontario, Canada), H. Tutassaura and R. Miyagishima. *Arch. Surg.* 103(1):73-75, 1971.

4401 ROLE OF GLUCAGON ON FATTY LIVER PRODUCTION IN BIRDS. (E.) de Oya, M. (Mt. Sinai Hosp., Minneapolis, Minn.), W. F. Prigge, D. E. Swenson and F. Grande. *Am. J. Physiol.* 221(1):25-30, 1971.

4402 PORTOSYSTEMIC SHUNTS IN THE MANAGEMENT OF MASSIVE HEMORRHAGE FROM ESOPHAGEAL VARICES DUE TO CIRRHOSIS OF THE LIVER. (E.) Lord, J. W., Jr. (Columbus Hosp., New York, N. Y.), G. Rossi, M. Daliana and L. M. Rosati. *Am. J. Surg.* 121(3):241-248, 1971.

4403 INFLUENCE OF INTRAVENOUSLY ADMINISTERED ALCOHOL ON ABSORPTION OF IRON FROM THE DIGESTIVE TRACT IN HEALTHY AND CIRRHOTIC SUBJECTS. (Cz.) Brodanova, M. (Charles U. 1st Intern. Dis. Clin., Prague) and V. Kordac. *Cas. Lek. Cesk.* 110(15):368-371, 1971.

4404 THE COAGULATION DEFECT IN REYE'S SYNDROME. (E.) Schwartz, A. D. (Yale U. Sch. Med., New Haven, Conn.). *J. Pediatr.* 78(2):326-328, 1971.

4405 A CASE OF ENCEPHALOPATHY ASSOCIATED WITH FATTY DEGENERATION OF THE LIVER (REYE SYNDROME). (It.) Rezza, E. (U. Rome 2nd Pediatr. Clin.), E. Cardi, G. Ballati and D. Lendvai. *Pediatria (Napoli)* 78(5):879-893, 1970.

See also numbers: 3857, 4270, 4347, 4385

4406 EFFECT OF CHOLESTEROL BIOSYNTHESIS INHIBITOR AY-9944 ON GALLSTONE FORMATION IN HAMSTERS. (E.) van der Linden, W. (Cent. Inst. Dept. Surg., Ostersund, Sweden), F. Nakayama and F. Bergman. *Acta Chir. Scand.* 137(4):355-360, 1971.

The addition of trans-1,4,-bis-(2-chlorobenzylaminomethyl)-cyclohexane dehydrochloride, AY-9944, a cholesterol synthesis inhibitor, to a gallstone-inducing diet virtually prevented the formation of cholesterol gallstones in hamsters. Fast acting sterols appeared in a significant amount in the bile of the treated group, the total bile acid concentration was slightly lower, and the phospholipid concentration remained relatively unchanged. Bile acid:total steroid and phospholipids:total sterol ratios were markedly lower in the AY-9944-treated groups. In the treated group an average of 43% of the liver sterol was found to be replaced by fast acting sterols; these sterols were totally absent in the control group. It is suggested that factors other than bile constituents play a role in gallstone formation.

4407 HEPATIC AND RENAL β-GLUCURONIDASE ACTIVITY DURING EXTRA-HEPATIC CHOLESTASIS. (E.) Sussi, P. L. (U. Padua Inst. Semeiot. Surg., Italy), F. F. Rubaltelli and D. de Marchi. *Acta Hepatosplenol. (Stuttg.)* 18(3):171-173, 1971.

Extrahepatic cholestasis was induced in rats by ligation of the common bile duct. Hepatic β-glucuronidase significantly increased after day 3 of extrahepatic cholestasis and this increment became more manifest with the progress of the pathological condition. No modification was observed in kidney β-glucuronidase. The enzymatic increase found in the liver tissue may be connected to an enzymatic induction mechanism owing to the rise of bilirubin glucuronide in the cholestatic liver. The increase of β-glucuronidase activity could be a basic factor accountable for the unconjugated bilirubin increment in the hepatic tissue and in plasm in extrahepatic cholestasis.

4408 SPONTANEOUS PERFORATION OF BILE DUCTS. (E.) Robertson, B. M. (Gen. Hosp., Gympie, Australia). *Med. J. Aust.* 1(22):1182-1183, 1971.

A diagnosis of peritonitis of unknown cause was made of an 81-yr-old male who was referred with a history of constant, dull, epigastric pain for 24 hr. On examination there was epigastric tenderness, liver dullness and normal chest X-rays. At operation using a right upper paramedian incision, several hundred ml of bile were removed from the gallbladder area. Inspection of the common bile duct disclosed a small area 1 cm in diameter in the right lateral border which was deeply stained green. The duct did not appear dilated and no stones could be palpated. A cholecystostomy was performed and the subhepatic space was drained. The etiology of spontaneous perforation may have been thrombosis of the vessels in the duct wall, producing a small infarct.

4409 BILE COMPOSITION: SWEDEN VERSUS JAPAN. ITS POSSIBLE SIGNIFICANCE IN THE DIFFERENCE IN GALLSTONE INCIDENCE. (E.) Nakayama, F. (Kyushu U. Fac. Med., Fukuoka, Japan) and W. van der Linden. *Am. J. Surg.* 122(1):8-12, 1971.

To elicit the possible reasons why gallstone incidence in the Far East averages 3 to 5% compared to 10 to 15% in the West, bile composition was studied in both normal Swedish and Japanese subjects. Results showed both bile and total lipid concentration to be greater in Swedish than in Japanese subjects. Bilirubin concentration in the bile was significantly higher in Swedish and cholesterol concentrations were nearly twice as high than in Japanese. There was little difference with respect to cholic and deoxycholic acid; however, the mean chenodeoxycholic acid concentration was markedly lower in the Swedish samples. The cholic acid:chenodeoxycholic acid ratio was significantly higher in the Swedish. Plotting of gallbladder bile composition from both countries on triangular coordinates of cholesterol, bile acids, and phospholipids revealed a marked difference: 12 of 19 Swedish samples moved out of the micellar zone as compared with only 1 of 20 Japanese samples.

4410 ACALCULOUS CHOLECYSTITIS. (E.) Andersson, A., L. Bergdahl and L. Boauist (U. Umea Inst. Pathol., Sweden). *Am. J. Surg.* 122(1):3-7, 1971.

A group of 62 patients undergoing cholecystectomy had cholecystitis without gallbladder stones including 22 with choledocholithiasis. Preoperative cholecystography showed a nonfunctioning gallbladder in most of these patients. In patients with choledocholithiasis the mean size of the common bile duct was 13.9 mm; in patients without, it was 9.3. Almost complete obliteration of the cystic duct occurred in 3 patients. Chronic cholecystitis was seen in most cases, and acute or both acute and chronic inflammation in most of the remaining cases. Jaundice, fever, epigastric distress, bile-stained urine, stool discoloration and pain in the upper right quadrant were the most frequent symptoms. Acalculous cholecystitis may often be caused by gallbladder stones that pass spontaneously before operation into the common duct or intestines.

4411 CHOLECYSTECTOMY IN THE AGED. (E.) Steiger, E. (U. Pennsylvania Hosp., Philadelphia), M. H. Seltzer and F. E. Rosato. *Ann. Surg.* 174(1):142-144, 1971.

Twenty of 51 elderly patients selected for cholecytectomy had accompanying arteriosclerotic heart disease. Common duct exploration was performed in 20 of the patients with 1 subsequent death. Seven patients had intra-abdominal carcinoma (colon, gallbladder, pancreas) and it was in this group that all of the 4 operative deaths occurred. In 5 of 9 patients undergoing emergency operation, acute cholecystitis was diagnosed pathologically. The remaining 4 had acalculous chronic cholecystitis. Nine of 51 patients had major postoperative complications: phlebitis, myocardial infarction, and/or hepatic insufficiency. The risk of cholecystectomy on the basis of age alone should not be a deterrent in the management of biliary tract disease in the elderly.

4412 THE EFFECT OF BILIARY TRACT PRESSURE ON BILE FLOW, BILE SALT SECRETION, AND BILE SALT SYNTHESIS IN THE PRIMATE. (E.) Strasberg, S. M., B. C. Dorn, D. M. Small and R. H. Egdahl (750 Harrison Ave., Boston, Mass.). *Surgery* 70(1):140-146, 1971.

In rhesus monkey preparations with nearly intact enterohepatic circulations, bile flow was decreased at high (17 to 22 cm of saline) but not moderately elevated (10 to 14 cm) common duct pressures. The changes in the bile salt secretion rates were similar to the changes in bile flow. Both flow and bile salt secretion returned gradually to normal (mean recovery time 56 hr). During the period of control and moderately elevated pressures, the ratio of radioactivity in bile salt to bile salt mass decreased steadily, and the plot of the ratio on a logarithmic scale was a straight line with a negative slope. During high biliary tract pressure the ratio did not decrease, and the plot assumed a zero slope; hence, no new bile salts were being synthesized. This inhibition of synthesis continued for about 6 hr at which time the original synthesis rate reappeared. Apparently, the reduced secretion of bile salts resulted in the accumulation of bile salts in the liver with resultant feedback inhibition of synthesis. The use of this primate preparation as a model for studying cholesterol gallstones in man is suggested.

4413 THE COMMON DUCT AFTER CHOLECYSTECTOMY. INTERVAL REPORT. (E.) Edmunds, R. (St. Luke's Hosp., New York, N. Y.), S. Katz, V. Garciano and N. Finby. *Arch. Surg.* 103(1):79-81, 1971.

The size of the common bile duct was measured by cholecystography in 60 patients to determine if compensatory dilatation of the common duct followed cholecystectomy and to try to correlate symptomatology with duct size and change in size. In these patients, the average duct size immediately following cholecystectomy was 7.5 mm and at the end of at least 5 yr (5-7 yr), the average duct size was 8.5 mm. In 33 of the patients the duct size increased, in 8 it remained the same, and in 19 the duct size decreased. In 15 patients in whom the common duct was measured preoperatively, there was no change in the average size (7.8 mm) after surgery. Eleven of the 60 patients had common bile ducts greater than 10 mm (considered dilated), ranging in size from 11 to 25 mm at some time in their postoperative period. Six of these 11 patients had symptoms referrable to the biliary tract, but none had to undergo further surgery.

4414 CHOLELITHIASIS IN THE AETIOLOGY OF GALLBLADDER NEOPLASMS. (E.) Hart, J. (Tel Hashomer Govt. Hosp., Israel), B. Modan and M. Shani. *Lancet* 1(7710):1151-1153, 1971.

Subjects consisted of all 345 newly diagnosed cases of gallbladder and biliary tract disease seen within a 5-yr period in Israel. Diagnosis was confirmed by direct histological examination in 74%, by histological examination of adjacent tissue in another 22% and at surgery in 4%. Gallstones were found in 69% of male and 83% of females with gallbladder cancer, as compared with 20% of males and 60% of females with biliary tract tumors, and this difference was significant. There was a similar frequency of gallstones in gallbladder cancer in both sexes and in all ethnic groups. The ethnic and sex trends were similar in terms of the incidence of gallstones and gallbladder cancer.

4415 THE RELATION BETWEEN FORMATION OF GALLSTONES RICH IN CHOLESTEROL AND THE SOLUBILITY OF CHOLESTEROL IN AQUEOUS SOLUTIONS OF BILE SALTS AND LECITHIN. (E.) Dam, H. (Polytech. Inst., Copenhagen, Denmark) and F. G. Hegardt. *Z. Ernaehrungswiss.* 10(3):239-252, 1971.

In bladder bile of young hamsters, chicks and mice reared on different experimental diets, previously determined molar ratios between total bile salts and cholesterol and between lipid soluble phosphorus and cholesterol were compared with recently established limits for solubility of cholesterol in aqueous solutions of suitable bile salts and lecithin. The molar ratios total bile acids:cholesterol and phospholipids:cholesterol corresponded to saturation or supersaturation when total phospholipids were considered equal to lecithin and the prevalence of cholesterol gallstones was high. These ratios corresponded to unsaturation when cholesterol gallstone prevalence was very low. Similar investigations on human bile showed these ratios to correspond to supersaturation in the majority of cases whether the bile was obtained from patients having gallstones rich in cholesterol, and functioning gallbladders, or from patients having peptic ulcers and normal liver and biliary tract.

4416 MARKED ELEVATION OF SERUM TRANSAMINASE ACTIVITIES IN EXTRAHEPATIC BILIARY TRACT DISEASE. (E.) Shora, W. (Washington Hosp. Ctr., D. C.) and S. H. Danovitch. *Am. J. Gastroenterol.* 55(6):575-588, 1971.

Twelve patients with extrahepatic biliary tract disease in whom one or both of the transaminase activities (SGOT, SGPT) were in excess of 400 μ are presented. Cholecystography and liver biopsy provided the most information regarding the interpretation of abnormal liver function tests and deciding on a course of therapy, particularly in 5 patients in whom levels were markedly elevated. In 2 patients it was not possible to demonstrate the presence of a dissociable stimulator of transaminase activity or the disappearance of a dissociable inhibitor of such activity. The rise in enzyme activities in these patients occurred early in the course of their illness and did not represent chronic injury as a result of obstruction.

4417 DISEASES OF THE GALLBLADDER IN INFANCY AND CHILDHOOD. (E.) Hanson, B. A. (U. Southern California Sch. Med., Los Angeles), G. H. Mahour and M. M. Woolley. *J. Pediatr. Surg.* 6(3):277-283, 1971.

Gallbladder disease was correctly diagnosed preoperatively in 21 of 34 (64%) patients under 17 yr of age by radiographic examination. Nine of 13 patients in whom plain films of the abdomen demonstrated right upper quadrant opacifications, had hemolytic disorders. Most laboratory studies were of limited value for diagnosis. In order to avoid operative complications to the common bile duct in this age group, operative cholangiograms should be done if there are small gallstones, a history of jaundice, or dilatation of the common bile duct. A total of 28 patients had cholelиths while 6, including 1 with associated choledochal cyst, had choledocholiths. Thirty patients were operated upon; 19 had cholecystectomy alone and 5 had common bile duct exploration. Six patients had cholecystectomy for acalculous cholecystitis. Three patients with an associated choledochal cyst had chronic cholecystitis.

4418 STUDIES ON HUMAN BILE. III. COMPOSITION OF DUODENAL BILE FROM HEALTHY YOUNG VOLUNTEERS COMPARED WITH COMPOSITION OF BLADDER BILE FROM SURGICAL PATIENTS WITH AND WITHOUT UNCOMPLICATED GALLSTONE DISEASE. (E.) Dam, H. (Univ. Hosp., Copenhagen, Denmark), I. Kruse, I. Prange, H. E. Kallehauge, H. J. Fenger and M. Krogh Jensen. *Z. Ernaehrungswiss.* 10(3):160-177, 1971.

The composition of duodenal bile from 42 controls subjects (Group A) was compared with the composition of bladder bile from patients with peptic ulcer (Group B) and patients having uncomplicated gallstone disease and functioning gallbladder (Group C). Bladder biles especially in Group B had higher concentrations of dry matter, cholesterol, lipid soluble phosphorus and bile acids than the duodenal biles. The mean value of the ratio between glycine-conjugation and taurine-conjugation was somewhat lower in Group A then in groups B and C. Group C demonstrated a higher mean value of the ratio between total bile acids and lipid soluble phosphorus, than was observed in Groups A and B, which showed equivalent values. About half of the biles in all 3 groups would be supersaturated with respect to cholesterol if the solubility of cholesterol in bile depended only on the components determined in the present study. There was scarcely any systematic difference in fatty acid composition of bile lecithin between the duodenal biles collected without material formation of lysolecithin and the bladder biles from Groups B and C.

4419 STUDY OF BILIRUBIN IN AMNIOTIC FLUID OF RATS WITH OBSTRUCTIVE JAUNDICE. (E.) Willoughby, H. W. (McGill U. Clin., Montreal, Quebec, Canada), T. Willis, T. K. Lee, S. Fuchigami, M. T. Kazeef and P. D. Desjardins. *Am. J. Obstet. Gynecol.* 110(5):663-666, 1971.

Serum bilirubin values from 12 pregnant rats with hepatic duct ligation were much higher than those seen in the control group, but only up to half as high as the values in nonpregnant rats with hepatic duct ligation. The values for the amniotic fluid samples were markedly higher than those of controls. Most of the material present in the extract from the test pool of amniotic fluid was unconjugated bilirubin. Apparently conjugated bilirubin does not pass from the maternal circulation to amniotic fluid. Obstructive jaundice in the pregnant rat was accompanied by an increase of total bilirubin in the amniotic fluid.

4420 CONGENITAL PREDUODENAL PORTAL VEIN. (E.) Johnson, G. F. (Barney Child. Med. Ctr., Dayton, Ohio). *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 112(1):93-99, 1971.

Clinical manifestations, if present, of congenital preduodenal portal vein are those of partial intestinal obstruction. Obstruction is not commonly due to extrinsic pressure of the preduodenal portal vein on the bowel, but due to radiologically demonstrable associated anomalies such as duodenal diaphragms, duodenal colic bands, malrotation, or annular pancreas. Late manifestations include: gastroduodenal ulcerations, pneumatosis, common mesentery and, if associated with biliary ductal anomalies, cirrhotic liver anifestations such as nodular enlargement. A oentgenographic diagnosis is emphasized to educe surgical hazards which may occur during rocedures for relief of duodenal obstruction, r as may occur during liver transplant.

421 EXTRAHEPATIC PORTAL OBSTRUCTION IN CHILDHOOD AND ITS ANGIOGRAPHIC DIAGNOSIS. E.) Rösch, J. (U. Oregon Med. Sch., Portland) nd C. T. Dotter. *Am. J. Roentgenol. Radium her. Nucl. Med.* 112(1):143-149, 1971.

ortal obstruction was visualized by splenoportography in 28 of 33 patients with extrahepatic ortal obstruction. In the remaining 5 cases, he portal obstruction was visualized during the enous phase of superior mesenteric arteriography. ost often, the entire length of the portal vein as occluded as was the case in 11 patients with nflammatory etiology. Hepatopetal collateral irculation was present in all patients. A umber of small or moderate sized and usually ortuous collaterals filled, forming an extensive ollateral network in the subhepatic region. epatofugal collaterals were present in most of he patients and carried blood to the stomach, sophagus, perisplenic region, retroperitoneal pace and the intestine. Angiography is essential oth to diagnostic evaluation and the selection f therapy in extrahepatic portal obstruction as t showed the site and extent of the primary esion and readily differentiated between extra- nd intrahepatic obstruction.

422 BILIARY PAIN IN YOUNG WOMEN IN THE ABSENCE OF GALLSTONES. (E.) Valberg, . S. (Queen's U. Dept. Med., Kingston, Ontario, anada), M. Jabbari, J. W. Kerr, A. C. Curtis, . Ramchand and R. S. A. Prentice. *Gastroenterology* 0(6):1020-1027, 1971.

he clinical features, results of investigation, nd the effect of cholecystectomy in 13 female atients with typical biliary type pain but no emonstrable gallstone or obstructive lesion in he biliary tract are presented. The injection f cholecystokinin produced biliary pain which losely resembled the previous attacks in all atients. In the 12 patients who had cholecy- tectomy, no abnormality was found on abdominal xploration, yet all obtained relief from the ntermittent attacks of biliary pain and vomiting. he pain in these patients seemingly arose from he gallbladder and/or cystic duct in the absence f apparent obstruction. Of the 13 patients, 9 lso had gastrointestinal disturbances associated ith emotional tension, and the observed biliary ract disorder may have been involved. The tiology of the observed pain is unknown in 4 atients in whom only vomiting occurred, and this nly in association with pain.

423 THE EFFECT OF LIVER TOXINS ON GALLSTONE FORMATION IN SYRIAN HAMSTERS. (E.) Bergman, F. (U. Umea Surg. Clin. Sweden), A. H. Juul and W. van der Linden. *Acta Hepatosplenol. (Stuttg.)* 18(3):215-223, 1971.

Hamsters fed on a weak gallstone-provoking diet and treated with CCl_4 showed a high degree of serious hepatic injury. They also demonstrated a greater tendency to form pigmented gallstones than did normal controls. Although long-term alcohol administration in drinking water did not lead to striking morphological changes of the liver, there was a strong tendency towards the formation of predominantly pigmented gallstones. Apparently there is no connection between formation of such stones and the degree of liver injury. Experiments, where a thyroxine-containing diet provoked both fatty liver and pigmented gallstones and xanthinol niacinate (Complamin) counteracted the first but not the second process, confirmed the above. When normal chow was given as a basic diet, alcohol administration had no effect on pigmented gallstone formation, indicating that alcohol alone does no suffice to induce gallstones.

4424 ELECTRON MICROSCOPIC STUDY OF EXPERIMENTAL EXTRAHEPATIC CHOLESTASIS. (Hun.) Balazs, M. *Morphol. Igazs. Orv. Szle* 11(1):1-10, 1971.

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4456 ALIMENTARY COMPLICATIONS OF NON-MALIGNANT RETROPERITONEAL FIBROSIS. (E.) Mitchell, R. J. (Southmead Hosp., Bristol, England). *Br. J. Surg.* 58(4):254-256, 1971.

The gut from esophagus to rectosigmoid may be involved in nonmalignant retroperitoneal fibrosis. Alimentary manifestations, although rare, includes obstructive jaundice, protein-losing enteropathies, pseudo-obstructions, and constricting lesions. The possibility of a desmoplastic response to malignancy must not be overlooked. Similarly, inflammatory processes may cause radiological obstruction and displacement of the ureters. Diverticulitis, retroperitoneal appendix mass, and regional enteritis have all been shown previously to affect the ureter radiologically. A case of involvement of the left ureter and rectosigmoid was reported and emphasized the difficulty of establishing a preoperative diagnosis.

4457 SALIVARY GLAND TUMORS IN THE PAROTID GLAND, SUBMANDIBULAR GLAND, AND THE PALATE REGION. (E.) Eneroth, C.-M. (Karolinska Hosp., Stockholm). *Cancer* 27(6):1346-1355, 1971.

In a series of 2,867 patients a palpable lesion in the parotid and submandibular gland was generally a true salivary gland tumor. In the palate, only 46% of all tumors were true salivary gland tumors. A true salivary gland tumor was more than 12 times more common in the parotid than in the submandibular gland. Of true salivary gland tumors, there was a striking predominance of pleomorphic adenomas. The second largest group were mucoepidermoid carcinomas. The highest incidence of malignancy of true salivary gland tumors was found in the palate, while the lowest was found in the parotid gland. Metastases were found in 75, 43 and 34% of patients with primary tumors located in the submandibular gland, the parotid gland, and the palate, resp. Prognosis, which apparently varies according to location of malignant tumor, seems most favorable when the tumor is in the palate and least favorable when it is in the submandibular gland.

4458 STEROIDS AND STEROLS IN MECONIUM. (E.) Kinsella, R. A., Jr. (St. Louis City Hosp., Mo.) and F. E. Francis. *J. Clin. Endocrinol. Metab.* 32(6):801-818, 1971.

Meconium was collected from healthy, full-term, spontaneously delivered male and female infants during the first 24 hours after birth and analyzed for steroids and sterols by various chromatographic methods. Thirty-two steroids and 3 sterols, most of which have been detected in other fetal sources were found. Emphasis was placed on the analysis of steroids present in the sulfate residues. Glucosiduronate, free and petroleum ether fractions contained trace amounts of 17-hydroxycorticosteroids. The compounds detected may represent either excretory end products accumulated during gestation, or they may be biliary and intestinal metabolites which enter into a dynamic enterohepatic circulation.

4459 DISEASES OF THE URACHUS SIMULATING INTRA-ABDOMINAL DISORDERS. (E.) Blichert-Toft, M. (Glostrup Hosp., Copenhagen, Denmark) and O. V. Nielsen. *Am. J. Surg.* 122(1):123-128, 1971.

Acquired urachal disease, most often encountered in adults, and unlike the congenital variety which generally manifests itself as oozing of urine from the umbilicus after separation of the cord, usually presents with uncharacteristic abdominal complaints, such as abdominal tension, meteorism, and periumbilical pain. If a suspected urachal cyst becomes infected, sudden hyperperpyrxia occurs with acute abdominal condition whose local findings are indistinguishable from those of acute appendicitis, Meckel's diverticulitis, or peritoneal irritation after perforation of a viscus into the peritoneal cavity. In a series of 5 patients discharge from the umbilicus was an important sign which was not always related to the abdominal complaints. True acute abdominal conditions can be caused by acquired urachal disease and include: ileus, small intestinal strangulation, and clamping of the intestinal lumen as a result of intraperitoneal localization of the urachus.

4460 XEROSTOMIA IN SJOGREN'S SYNDROME. EVALUATION BY SEQUENTIAL SALIVARY SCINTIGRAPHY. (E.) Schall, G. L. (NIH, Bethesda, Md.), L. G. Anderson, R. O. Wolf, J. R. Herdt, T. M. Tarpley, Jr., N. A. Cummings, L. S. Zeiger and N. Talal. *Jama* 216(13):2109-2116, 1971.

Based on the pattern of ^{99}m Tc pertechnetate uptake, concentration, and excretion by the major salivary glands, patients with Sjogren's syndrome were grouped from scintographic results into 4 classes: normal, mild, severe and very severe involvement. A strong positive trend was suggested between the scintigraphy class and the clinical grading, clinically apparent xerostomia being included in the latter 3 classes. There was also a positive trend between the scintigraphy class and the salivary flow rates. There was a close relationship between the radiological findings and the scintigraphy class, but no trend between lip biopsy and scintigraphy results. The most important feature of sequential salivary scintigraphy may prove to be its sensitivity in depicting small changes in glandular dysfunction, as illustrated by the ability to detect asymmetry in parotid gland activity and the improvement in glandular function with immunosuppressive therapy.

461 RESPONSE OF LYMPHOCYTES FROM PATIENTS
WITH GASTROINTESTINAL CANCER TO THE
ARCINOEMBRYONIC ANTIGEN OF THE HUMAN DIGESTIVE
YSTEM. (E.) Lejtenyi, M. C., S. O. Freedman
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n lymphocyte preparations from normal individuals,
he ratio of ^{3}H-thymidine incorporation in cul-
ures incubated with carcinoembryonic antigen
ompared to control cultures was 1.06. A com-
arable value of 1.30 was obtained from patients
hose digestive system tumors had apparently
een totally removed, while the groups constituted
f patients harboring tumor tissue and pregnant
omen gave values of 0.913 and 1.13, respectively.
hese ratios were not significantly different
rom one another or from unity. Employing
ymphocyte transformation as an index of cell
ediated immunity, no evidence was obtained for
his type of immune reactivity against carcino-
mbryonic antigen.

462 POLYARTERITIS AS A CAUSE OF INTESTINAL
HEMORRHAGE. (E.) Cabal, E. (St. Louis
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43-year-old Negro male with polyarteritis mani-
esting profuse intestinal bleeding after two
pisodes of spontaneous perirenal hemorrhage is
resented. Multiple aneurysms in the small and
edium size visceral arteries, virtually patho-
nomic of the disease, were demonstrated by
rteriography. Contrast medium was extravasated
n the vicinity of the gastroduodenal artery,
hich was presumed to be the site of bleeding.
ertinent histological findings were confined to
he small and medium size arteries of the gall-
ladder, peripancreatic tissue, and soft tissue
round the vagus nerve. There was swelling and
ibrinoid necrosis of the subendothelial and
edial layera with subsequent narrowing and throm-
osis in the lumen.

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rossman. *Lancet* 1(7707):1025-1026, 1971.

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4482 CHRONIC TOXICITY OF PRODUCTS FORMED BY BINDING OF SO_2 TO GASEOUS AMMONIA INTRODUCED INTO THE ALIMENTARY TRACT. (Pol.) Kosmider, S. (Slaskiej Akad. Med., Zabrze, Poland), M. Drozdz and M. Luciak. *Med. Pracy* 22(1):27-40, 1971.

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4486 THERAPEUTIC MANAGEMENT OF ACUTE INTESTINAL INFECTIONS. (Fr.) Bals, M. G. (Inst. Med. Pharmacol. Bucharest, Rumania). *Arch. Un. Med. Balkan. (Buc.)* 8(3):244, 1970.

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4489 RETROSPECTIVE STUDY OF 85 CASES OF IDIOPATHIC GASTROINTESTINAL HEMORRHAGE. (Fr.) Bitoun, A. (St. Antoine Hosp., Paris) and M. Conte. *Sem. Hop. Paris* 47(3):177-185, 1971.

4490 RADIOLOGIC EXAMINATION OF THE GASTROINTESTINAL TRACT IN INFANTS AND CHILDREN UNDER 4 YEARS OF AGE. (E.) Weber, A. L. (Massachusetts Gen. Hosp., Boston), K. Sang Oh and F. B. Watts, Jr. *Radiol. Clin. North Am.* 9(1):5-14, 1971.

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4497 ULTRASTRUCTURAL STUDIES OF THE BLOOD FLUKE - SCHISTOSOMA MANSONI. IV. THE DIGESTIVE SYSTEM. (E.) Spence, I. M. (Poliomyelitis Res. Found., Johannesburg, South Africa) and M. H. Silk. *S. Afr. J. Med. Sci.* 35(3-4):93-112, 1970.

Structurally the digestive system of S mansoni is a syncytium in which each component is in cytoplasmic continuity with its neighbors. The free surface of the syncytium forms the covering of the body either as its external surface or as the luminal border of internal systems which are invaginations of the exterior. This free edge of the syncytium is modified into a system of looped concentric cytoplasmic extensions which form a network of fenestrations, channels or canaliculi. The nulcei are basally situated within a karyoplasm which is more electron dense in the apical regions. The system is secretory in nature and its products mature from Golgi material discharged into granular lacunae associated with the unorganized endoplasmic reticulum. A heparin like substance may be elaborated by the body covering and pharynx and could be integrated, as the carbohydrate component, of an enterokinase like enzyme produced in the esophagus. A heparin containing lipoprotein lipase could be secreted by the gut. Where the tegument is subject to stress, invaginations of the plasma membrane are bridged by a septate desmosome associated with a tight junction which occludes an evagination of the basement membrane.

4498 IMMUNE REACTIONS IN MUCOUS MEMBRANES. III. THE DISCHARGE OF INTESTINAL MAST CELLS DURING HELMINTH EXPULSION IN THE RAT. (E.) Miller, H. R. P. (U. Glasgow Vet. Sch., Scotland). *Lab. Invest.* 24(5):248-254, 1971.

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4500 RADIOLOGICAL EXAMINATIONS IN SUBJECTS INFESTED BY INTESTINAL PARASITES. (Pol.) Mielecki, T. (Med. Acad. Radiol. Clin., Wroclaw, Poland), J. Gajewski, A. Gladysz and W. Plewako. *Pol. Przegl. Radiol.* 34(4):513-522, 1970.

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JUNE 1971
VOLUME 6, NO. 6
4501 — 5400

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Volume 6, No. 6 Abstracts and Citations Nos. 4501-5400

GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the
National Institute of Arthritis and Metabolic Diseases

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PREFACE

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Use of Funds for Printing this publication
approved by the Director of the Bureau of
the Budget on October 7, 1968.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington D. C. 20402. Subscription price per year in the United States, Canada, and Mexico, $16.00; foreign, $4.00 additional; and $1.25 for a single copy. Payment is required in advance, and check or money order should be made payable to the Superintendent of Documents.

NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations (with some modifications) found in *World Medical Periodicals*, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	It.	Italian
Ar.	Arabic	Jap.	Japanese
Bul.	Bulgarian	Kor.	Korean
Ch.	Chinese	Latv.	Latvian
Cz.	Czech	Lith.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
E.	English	Por.	Portuguese
Eston.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fl.	Flemish	Ser.	Serbo-Croatian
Fr.	French	Sl.	Slovak
Ger.	German	Sp.	Spanish
Gr.	Greek	Sw.	Swedish
Heb.	Hebrew	Th.	Thai
Hun.	Hungarian	Turk.	Turkish
Ic.	Icelandic	Uk.	Ukrainian
In.	Indonesian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	min	minute(s)
ADP	adenosine diphosphate	ml	milliliter(s)
AMP	adenosine monophosphate	mm	millimeter(s)
ATP	adenosine triphosphate	MTD	maximum tolerated dose
BSP	sulfobromophthalein	NAD	nicotanamide adenine dinucleotide
C	degrees centigrade	NADH	reduced nicotinamide adenine dinucleotide
cm	centimeter(s)	NADP	nicotinamide adenine dinucleotide phosphate
CNS	central nervous system	NADPH	reduced nicotinamide adenine dinucleotide phosphate
cpm	counts per minute		
DNA	deoxyribonucleic acid	ng	nanogram (10^{-9})
e.g.	for example	pg	picogram (10^{-12})
g	gram(s)	p.o.	orally
μg	microgram(s)	ppm	parts per million
hr	hour(s)	r	Roentgen
i.m.	intramuscular	RBC	red blood cells (erythrocytes), red blood count
i.p.	intraperitoneal		
IU	international unit(s)	resp.	respectively
i.v.	intravenous	Rev.	review (only in citations)
kg	kilogram(s)	RNA	ribonucleic acid
LD_{50}	median lethal dose(s)	s.c.	subcutaneous
LDH	lactic acid dehydrogenase	sec	second(s)
m	meter(s)	SGOT	serum glutamic-oxalacetic transaminase
M	molar	SGPT	serum glutamic-pyruvic transaminase
mEq	milliequivalent(s)	U	unit(s)
mM	millimolar	UV	ultraviolet
μM	micromolar	WBC	white blood cells (leukocytes), white blood count
mC, μC	milli-,microcurie(s)		
mg	milligram(s)	yr	year(s)

4501 EFFECT OF METYRAPONE ON LIVER ULTRASTRUCTURE IN ADRENALECTOMIZED RATS.
(Fr.) Dardachit, D. (U. Montreal Inst. Med. Exp. Surg., Quebec, Canada), B. D. Garg, J. D. Khandekar and K. Kovacs. *Ann. Anat. Pathol. (Paris)* 16(1): 55-60, 1971.

Metyrapone (10 mg p.o. twice a day) was administered for 10 days to adrenalectomized ARS/Sprague-Dawley rats who were being maintained on cortisone acetate (400 µg/day s.c.). Electron microscope studies of liver tissue showed that metyrapone caused proliferation of the smooth endoplasmic reticulum in both adrenalectomized rats and in nonadrenalectomized controls. This proliferation was especially pronounced in the perinuclear regions, near the cell membrane, and in areas where glycogen was stored. The rough endoplasmic reticulum, which was present in all cells, appeared normal in some areas but was completely disorganized in others. Adrenalectomy did decrease the glycogen content of the liver, but metyrapone had no effect on this decrease.

502 ELECTRON MICROSCOPE RADIOAUTOGRAPHIC IDENTIFICATION OF SEROTONIN-SYNTHESIZING
ELLS IN THE MOUSE GASTRIC MUCOSA. (E.) Rubin,
. (Med. Coll. Pennsylvania, Philadelphia), M.
. Gershon and L. L. Ross. *J. Cell Biol.* 50(2):
99-415, 1971.

dult mice received i.v. injections of ^{3}H-5-hydroxy-
ryptophan and were sacrificed 2 hr later. Sec-
ions of gastric mucosa were then fixed for elec-
ron microscopy by a series of steps which ensured
etention of serotonin but which washed out all
he labeled precursor as well as 5-hydroxytryp-
amine-o-glucuronide. Another group of mice was
njected i.v. with ^{3}H-tryptamine 1 hr. after i.p.
njection of the monamine oxidase inhibitor, phenip-
azine. In tryptophan-injected mice both light-
nd electron microautoradiographs showed excel-
ent localization of label in gastric endocrine
nd mast cells, but in no other types of mucosal
ells. Labeled cells were observed throughout
he gastric glands below the pits; most labeled
ells were located in the lower portions of the
lands while relatively few were observed in the
ecks. The same 5 morphological types of cells
escribed by other investigators were observed:
he type 1 or enteroserotonin cell, thought to
e a source of serotonin; the type 2 of intestinal
cell, thought to be a possible source of glucagon;
he type 3 or intestinal D cell; the type 4 or
nterocatecholamine cell; and the type 5 cell,
hought to be the gastrin-producing cell. Silver
rains were generally associated with the granules
n both endocrine and mast cells. Labeling varied
irectly with the number of granules. Sections
rom mice injected with labeled serotonin and
rom tissues incubated with labeled serotonin
n vitro revealed heavy labeling of mast cells and of the myenteric plexus, but not of gastric endocrine cells.

4503 CHANGES IN STRUCTURE AND PEPTIDASE ACTIVITY OF RAT SMALL INTESTINE INDUCED BY PREDNISOLONE. *(E.) Wall, A. J. (U. Chicago Dept. Med., Ill.) and T. J. Peters. *Gut* 12(6):445-448, 1971.

The effect of prednisolone (0.15 mg daily) on the morphology and enzyme activity of the small intestinal mucosa was studied in normal adult rats. A significant decrease of villous height and crypt depth was found in both jejunum and ileum of treated rats. Electron microscopy revealed no abnormalities, and in particular no increase of endoplasmic reticulum of microvillus size. Leucyl-β-naphthylamidase activity was increased in both jejunum and ileum and a significant increase of both brush border and soluble peptidase activity was seen in treated animals. There were no significant changes in the activity of 2 lysosomal enzymes tested (aryl sulphatase and pteroylpolyglutamate hydrolase).

4504 ENDOCRINE CELLS OF THE HUMAN GASTRIC MUCOSA. (E.) Vasallo, G. (U. Pavia Inst. Pathol. Anat., Italy), C. Capella and E. Solcia. *Z. Zellforsch. Mikrosk. Anat.* 118(1): 49-67, 1971.

The endocrine cells of the human gastric mucosa were studied by conventional electron microscopy and by selective staining techniques for endocrine granules to ascertain the number of cell types and to what extent their structural and staining patterns are distinctive. Five types of cells were identified: enterochromaffin cells (EC) which stored 5-hydroxytryptamine (5-HT), G cells which stored gastrin, enterochromaffin-like (ECL) cells, and D and D_1 cells. While D cell granules were not stained by either argentaffin or argyrophil methods, EC cell granules were stained by the argentaffin method. Both EC and ECL cell granules were stained heavily by the Sevier-Munger technique, and EC, ECL, G and D_1 cell granules reacted to the Grimelius technique. Four of these 5 cell types could also be differentiated using light microscopy when 5-HT techniques, lead-hematoxylin, HCl-basic dye method and the aforementioned silver techniques were utilized.

4505 LIGHT AND ELECTRON MICROSCOPIC IDENTIFICATION OF THE HISTAMINE-STORING ARGYROPHIL (ECL) CELL IN MURINE STOMACH AND OF ITS EQUIVALENT IN OTHER MAMMALS. *(E.) Capella, C. (U. Pavia. Inst. Pathol. Anat., Italy), G. Vassallo and E. Solcia. *Z. Zellforsch. Mikrosk. Anat.* 118(1): 68-84, 1971.

The gastric mucosa of 8 mammalian species was studied by light and electron microscopy in an attempt to identify the ultrastructural counterpart of the "enterochromaffin-like" cells described by Hakanson and coworkers. The oxyntic glands of the rat, mouse, guinea pig, rabbit, cat, dog, pig and human were found to contain many non-enterochromaffin endocrine cells which were considered enterochromaffin-like (ECL) cells. These cells were found to contain secretory granules (with irregular cores) which stained heavily with Grimelius' silver, Sevier-Munger silver or phosphotungstic acid in all species and with Masson's argentaffin method in the cat and rabbit. The ECL cells observed in the rat and mouse seem to correspond to the argyrophil non-argentaffin histamine-storing cells described by Hakanson and Owman; however, in the other 6 species, other gastric argyrophilic ECL cells were thought to be present. ECL cell granules were found to store substances other than monoamines, which may account for the staining and electron opacity that are retained when histochemically and cytochemically detectable amines are lacking.

4506 HEPATIC ULTRASTRUCTURAL CHANGES IN ACUTE FRUCTOSE OVERLOAD. (E.) Yu, D. T. (U. Toronto Banting Inst., Ontario, Canada) and M. J. Phillips. *J. Ultrastruct. Res.* 36(1-2): 222-236, 1971.

The effect of acute fructose overload on hepatic ultrastructure was studied in rats infused with 40% fructose and sacrificed after 5, 10, 15, 30 or 60 min of infusion. The earliest detectable change in hepatocyte ultrastructure was observed within 5 min of fructose infusion and consisted of a rarefaction of the hyaloplasm which was probably attributable to intracellular edema. At the same time, cellular organelles lost their normal spatial relationship and arrangement. The smooth endoplasmic reticulum was disposed entirely as nodular aggregations and the Golgi apparatus showed a diminution and simplification of its structure. The rough endoplasmic reticulum was partially disorganized, with detachment of ribosomes, and gave rise to various membranous structures, predominantly membranous whorls. After 1 hr. of fructose infusion, these changes were more advanced, and scattered cells showed a loss of free ribosomes and condensation of mitochrondrial matrix. It was thought that these changes may have been due to the sudden drop in ATP which occurs in acute fructose overloading.

4507 GASTRIC MAST CELLS IN MAN AND THE DOG AND THEIR RELATION TO THE STRUCTURE AND FUNCTION OF THE GASTRIC GLANDS PROPER. (Rus.) Lopunova, Zh. K. (Kuban Med. Inst., Krasnodar, USSR) and A. A. Fisher. *Arkh. Anat. Gistol. Embriol.* 59(4):32-37, 1971.

After staining with basic brown, biopsied material from the gastric fundus of 6 normal humans revealed that mast cells, most of which were cigar-shaped or spindle-shaped, were spread evenly throughout the mucosa. The mast cells in the submucosa were oval or round, and the number of these cells was 1.5 times greater than in the mucosa. Mast cells in the gastric fundus of 8 male dogs were oval or, more rarely, round in both the mucosa and submucosa. In the mucosa of 3 dogs some mast cells were surrounded by ring-like structures; these rings were extremely rare in the submucosa. In contrast to man, mast cells were not evenly distributed throughout the mucosa but were found primarily in the upper third. There was no correlation between the number of mast cells in the gastric mucosa and the number of acid-secreting, pepsinogen-secreting, or mucus-secreting cells in the gastric glands proper or between the number of mast cells and histamine-induced gastric secretion in either man or the dog.

4508 ULTRASTRUCTURAL AND IMMUNOFLUORESCENT INVESTIGATIONS ON THE SECRETIN CELL IN THE DOG INTESTINAL MUCOSA. (E.) Bussolati, G. (U. Turin Inst. Pathol. Anat., Italy), C. Capella, E. Solcia, G. Vassallo and P. Vezzadini. *Histochemie* 26(3):218-227, 1971.

The source of secretin in the dog intestinal mucosa was examined with regard to ultrastructure, staining and immunohistochemistry. Large numbers of endocrine non-enterochromaffin cells were present in the mucosa, which, based on their ultrastructural, staining and distributive patterns could be classed as 4 types of cells. S and D cells were usually found in the upper parts of the small intestine, L cells were concentrated in the lower portions of the small intestine, and I cells showed distribution patterns intermediate between S and L cells. In immunoflourescent tests using antisecretin sera, numerous small epithelial cells displaying selective green flourescence were found in the duodenal crypts; very few cells of the same kind were observed in the ileal mucosa. The S cell appears to be the only cell that reproduces the distribution of secretin activity throughout the gastrointestinal tract.

4509 STUDIES ON THE MORPHOLOGY OF BILE SECRETION USING AN X-RAY CONTRAST PREPARATION. I. DESCRIPTION OF THE TECHNIQUE AND LIGHT MICROSCOPIC OBSERVATIONS UNDER NORMAL CONDITIONS. (E.) Sandström, B. (U. Uppsala Dept. Human Anat., Sweden) and B. Sjölund. *Cytobiologie* 3(3):381-386, 1971.

Bile secretion under normal conditions was studied in adult male rats with light microscopy using an X-ray contrast preparation (Biligrafin). Five min after the beginning of injection of Biligrafin, staining was seen in abundant endocytosis vesicles in the endothelial cells lining the sinusoids. At 10 min, the dye was seen in the sinusoidal epithelium and along the intracellular borders of many parenchymal cells, and at 15 min faint staining of interhepatocytic borders was widespread. By 20 min after injection, staining was seen in most bile canaliculi and this increased in intensity over the next 5 min. By 30 min after Biligrafin injection, the dye was almost solely localized in the bile canaliculi which became distinctly delineated.

4510 THE INFLUENCE OF VITAMIN E DEFICIENCY ON BIOLOGICAL MEMBRANES. AN ULTRASTRUCTURAL STUDY ON THE INTESTINAL EPITHELIAL CELLS OF DUCKLINGS. (E.) Molenaar, I. (U. Groningen Ctr. Med. Electron Micros., Netherlands), J. Vos, F. C. Jager and F. A. Hommes. *Nutr. Metab.* 12(6):358-370, 1970.

The outer membranes of the mitochondria often showed less positive contrast than the inner membrane, and thinning was occasionally discontinuous. Nuclear membranes and membranes of the endoplasmic reticulum also showed less contrast. The architecture of the cell as a whole remained intact; however, a large number of extramitochondrial myelin figures, Golgi apparatuses, and multivesicular bodies were observed. Mitochondria were decreased in size. The disturbed membrane image of the intestinal epithelial cell of the duckling was similar to that in patients with abetalipoproteinemia. Contrast loss in membranes may be explained as a loss of double bonds and probably as a visualization of lipid peroxidation. Since the morphology of the cell remained reasonably intact and cell organelle changes were nonspecific, an increased activity of lysosomal enzymes by specific lesions of the lysosomal membranes only, directly caused by vitamin E deficiency, is not probable.

4511 MODIFICATION OF CECAL SIZE IN GERMFREE RATS. (Ger.) Juhr, N. C. (Univ. Inst. Exp. Med., Berlin/Dahlem, Germany), H. Udes and H. H. Hiller. *Z. Versuchstierkd.* 13(2):115-125, 1971.

4512 DESMOSOMES, CILIA AND PECULIAR STRUCTURE OF MEMBRANES IN ERYTHROBLASTS OF HUMAN FETAL LIVER. (E.) Fukuda, T. (Tohoku U. Sch. Med., Sendai, Japan) and H. Sato. *Virchows Arch. [Zellpathol.]* 7(4):309-318, 1971.

4513 FINE STRUCTURE OF THE SMALL BOWEL IN DERMATITIS HERPETIFORMIS. (E.) Laguens, R. (La Plata Sch. Med., Argentina), F. Schaposnik and R. Echeverria. *Virchows Arch. [Pathol. Anat.]* 352(1):34-42, 1971.

4514 EFFECT OF Ca AND Mg IONS ON THE ULTRASTRUCTURE OF LIVER CELLS. (Rus.) Ol'shevskaia, L. V. (Inst. Exp. Clin. Oncol., Moscow) and E. A. Modianova. *Tsitologiia* 13(1):37-41, 1971.

4515 INTRAEPITHELIAL CELLS IN THE HUMAN INTESTINAL MUCOSA. (E.) Toner, P. G. (Western Infirm., Glasgow, Scotland) and A. Ferguson. *J. Ultrastruct. Res.* 34(3-4):329-344, 1971.

4516 OBSERVATIONS ON THE FINE STRUCTURE OF THE NORMAL PORCINE LIVER. (E.) Flaks, B. (U. Bristol Med. Sch., England). *J. Anat.* 108(3):563-577, 1971.

4517 NERVE TERMINALS AND CELLULAR JUNCTIONS IN YOUNG AND ADULT MOUSE SUBMANDIBULAR GLANDS. (E.) Yohro, T. (U. Tokyo Sch. Med.). *J. Anat.* 108(3):409-417, 1971.

4518 COMPARATIVE STUDY ON THE PERFUSION MEDIUM DEPENDENT HISTOLOGICAL AND BIOCHEMICAL FINDINGS IN THE PERFUSED RAT LIVER. (Ger.) Roschlau, G. (Carl Gustav Carus Med. Acad., Dresden, Germany), M. Walther and L. Tschopel. *Exp. Pathol.* 5(1-2):20-27, 1971.

4519 ULTRASTRUCTURAL CHANGES IN LIVER CELLS DUE TO SUPRANORMAL TEMPERATURE. (Ger.) David, H. (Humboldt U. Pathol. Inst., Berlin), I. Uerlings and M. Grupe. *Exp. Pathol.* 5(1-2):2-10, 1971.

4520 ULTRASTRUCTURE OF THE ACINAR CELL OF THE RAT PANCREAS DURING STARVATION. (Sl.) Kapeller, K. (U. Komenskeho Med. Sch., Bratislava, Czechoslovakia), M. Mikulajova and A. Bucko. *Bratisl. Lek. Listy* 55(1):70-79, 1971.

4521 MORPHOMETRIC STUDIES ON THE RAT LIVER. PARENCHYMAL CELL AFTER THE APPLICATION OF DIFFERENT FIXATION BUFFERS. (Ger.) Stockmann, F. (U. Basel Inst. Pathol., Switzerland), L. Bianchi, H. P. Rohr and H. Eckert. *Experientia* 26(2):174-176, 1970.

4522 ULTRASTRUCTURAL ASPECTS OF THE HUMAN DUODENO-INTESTINAL MUCOSA: A CONTRIBUTION TO A PHYSIOPATHOLOGICAL STUDY. I. A STUDY OF NORMAL HUMAN DUODENO-INTESTINAL MUCOSA. (Fr.) Labó, G. (U. Bologna Inst. Spec. Med. Pathol., Italy), G. Gasbarrini and F. Miglio. *Ann. Gastroenterol. Hepatol. (Paris)* 7(4):293-312, 1971.

4523 THE RECTAL GLANDS OF THE RABBIT. LIGHT MICROSCOPICAL AND HISTOCHEMICAL INVESTIGATIONS. (Ger.) Kühnel, W. (U. Kiel Inst. Anat., Germany). *Z. Zellforsch. Mikrosk. Anat.* 118(1):127-141, 1971.

4524 PRESENCE AND IMPORTANCE OF NUCLEAR GLYCOGENS IN LIVER CELLS. (Ger.) Schuppel, K. F. (Karl Marx U. Dept. Vet. Med., Leipzig, Germany) and J. Schleicher. *Monatshefte Vet. Med.* 25(23):912-916, 1970.

4525 CRYSTALLINE INCLUSIONS IN THE MITOCHONDRIA OF HEPATOCYTES. (Cz.) Bednar, B. (Charles U. Inst. Med., Prague). *Cesk. Patol.* 6(4):169-173, 1970.

4526 BEHAVIOR OF THE RAT ESOPHAGUS IN ARTIFICIAL MEDIUM. (It.) Gremigni, D. (U. Florence Inst. Norm. Human Anat., Italy). *Arch. Ital. Anat. Embriol.* 75(3-4):195-208, 1970.

4527 DEVELOPMENT OF STRUCTURE AND FUNCTION IN THE FETAL AND NEWBORN STOMACH. (E.) Deren, J. S. (U. Pennsylvania Sch. Med., Philadelphia). *Am. J. Clin. Nutr.* 24(1):144-159, 1971.

4528 SEPARATION OF MAST CELLS IN SUCCESSIVE STAGES OF DIFFERENTIATION USING PROGRAMMED GRADIENT SEDIMENTATION. (E.) Pretlow, T. G. (Rutgers Med. Sch., New Brunswick, N. J.) and I. M. Cassady. *Am. J. Pathol.* 61(3):323-339, 1971.

4529 THE NORMAL HUMAN LIVER CELL. CYTOCHEMICAL AND ULTRASTRUCTURAL STUDIES. (E.) Ma, M. H. (Albert Einstein Coll. Med., Bronx, N. Y.) and L. Biempica. *Am. J. Pathol.* 62(3):353-390, 1971.

See also numbers: 4536, 4545, 4632, 4781, 5097

530 EXPERIMENTAL STUDIES ON THE SITE OF INTESTINAL CALCIUM ABSORPTION. (Ger.) albritter, R. (Univ. 1st Med. Clin., Munich, ermany). *Z. Gesamte Exp. Med.* 154(1):70-86, 971.

hen low concentrations of $^{45}CaCl_2$ (0.078 mM/liter a^{++}) were administered p.o. to young Charles iver rats under physiological conditions, Ca^{++} bsorption occurred primarily in the distal ejunum and proximal and middle ileum. When ower concentrations of $^{45}CaCl_2$ (0.027 mM/liter a^{++}) were given p.o. to male rats and the time f contact with the intestine was increased by losing the small intestine off with a clip at arious intervals proximal to the ileocecal alve, Ca^{++} absorption occurred primarily in the egments immediately proximal to the site of losure. These experiments demonstrate that the ite at which Ca^{++} is absorbed in the small ntestine is determined primarily by the time f contact between Ca^{++} and the intestinal wall.

531 EFFECT OF SECRETIN UPON MOVEMENTS OF WATER AND ELECTROLYTES ACROSS THE SMALL NTESTINE IN MAN. (E.) Modigliani, R. (Saint-azare Hosp., Paris), P. M. Huet, J. C. Rambaud nd J. J. Bernier. *Rev. Eur. Etud. Clin. Biol.* 6(4):361-364, 1971.

ubjects consisted of 10 volunteers without small ntestine disease who swallowed a tube which ermitted infusion and sampling from the jejunum nd from the ileum. Basal measurements of movement of water and electrolytes were made after 5 min of perfusion of intestine with an isotonic o saline solution at a rate of 5 ml/min., after 45-min equilibration period. After this, the ntestine was perfused at the same rate with the ample solution containing, in addition, Boots ecretin in a dose of 3 IU/kg/hr, after which imilar measurements were made. There was a light, but not significant, increase in net ater absorption in the ileum with secretin, hile there were no significant changes in net ejunal absorption of water or in the unidirecional fluxes of water in the jejunum or ileum. gain, secretin failed to significantly alter he net movements of Na$^+$, K$^+$, Cl$^-$, or HCO_3^- nor he unidirectional fluxes of sodium and potassium n either jejunum or ileum. No further effect as seen with use of a more purified preparation f secretin.

532 RELATIONSHIP BETWEEN PASSIVE PERMEABILITY TO NONELECTROLYTES AND ACTIVE TRANSORT ACTIVITY IN THE ISOLATED INTESTINAL WALL. E.) Faelli, A. (U. Milan Inst. Gen. Physiol., taly), G. Esposito, G. Garotta and V. Capraro. *xperientia* 27(6):652-653, 1971.

he relationship between passive permeability to onelectrolytes and active transport was studied in rats using continuous circulation of the perfusion fluid through open and everted intestinal tracts. The thermal diffusion of small molecules such as acetamide and thiourea across the intestinal barrier was reduced together with the active transport of D-glucose, when NaCl of the incubating medium was replaced by equiosmolar quantities of Tris Cl, Choline Cl, or LiCl. Tris Cl substitution for NaCl in the bathing fluid was paralleled by a significant shrinkage of the epithelial cells. The permeability of phlorhizin-poisoned epithelium, where glucose transport was absent and cellular swelling was reduced, was as high as in the cases of glucose transporting intestines. The degree of swelling of the epithelial cell does not seem to be critical for the passive permeability to acetamide of the intestinal barrier.

4533 EFFECT OF CORTISONE TREATMENT ON THE ACTIVE TRANSPORT OF CALCIUM BY THE SMALL INTESTINE. (E.) Kimberg, D. V. (Columbia U. Coll. Physicians Surg., N. Y.), R. D. Baerg, E. Gershon and R. T. Graudusius. *J. Clin. Invest.* 50(6):1309-1321, 1971.

Everted gut sacs were prepared from the proximal 4-5 cm of duodenum of male Sherman rats. The transport of Ca$^+$ by these sacs was decreased by prior treatment with either cortisone, hydrocortisone or prednisolone, compared with saline-treated controls. The effect on Ca$^+$ transport persisted for 5 days after cessation of a 7-day course of 5 mg/d of cortisone. The administration of vitamin D in dose of 12,000 IU at 7,5,3, and 1 day before sacrifice had no significant effect on steroid-treated or control rats. No hormone-related defects in either the localization of vitamin D or its metabolism to 25-hydroxycholecalciferol could be shown by studies on the effects of cortisone on the level of vitamin D-dependent duodenal Ca-binding protein, the amount of bioassayable vitamin D activity in the mucosa and the distribution and metabolism of ^{3}H-vitamin-D_3. In a manner similar to that with Ca$^+$, cortisone diminished the rate of transfer of Sr+ and Fe+ in duodenal gut sacs and enhanced transfer in ileal sacs, while cortisone had no significant effect on the transfer of Ba$^+$. The ileal transfer of L-leucine was not affected by previous treatment with cortisone, but the rate of transfer of D-galactose in the jejunum was increased.

4534 ABSORPTION OF CYANOCOBALAMIN, COENZYME B_{12}, METHYLCOBALAMIN, AND HYDROXOCOBALAMIN AT DIFFERENT DOSE LEVELS. (E.) Adams, J. F. (Southern Gen. Hosp., Glasgow, Scotland), S. K. Ross, L. Mervyn, K. Boddy and P. King. *Scand. J. Gastroenterol.* 6(3):249-252, 1971.

Whole body monitoring was used to measure whole body retention of 4 radioactive cobalamins each given p.o. at dose levels of 1, 5 and 25 μg. At all dose levels, those given ^{58}Co cyanocobalamin were also given ^{57}Co coenzyme B_{12} 24 hr. later, while those given ^{58}Co methylcobalamin were also given ^{57}Co hydroxycobalamin 24 hr later. Subjects consisted of 63 patients with a variety of diseases, most of whom were in the convalescent phase. At the 1 μg dose level, the retention of hydroxycobalamin was significantly greater than that of methylcobalamin and coenzyme B_{12}; that of cyanocobalamin was significantly higher than that of coenzyme B_{12}; and that of methylcobalamin was significantly greater than that of coenzyme B_{12}. At the 5 μg dose level, retention, in decreasing order was: cyanocobalamin, methylcobalamin, hydroxycobalamin and coenzyme B_{12}; the retention with cyanocobalamin and methylcobalamin were both significantly greater than coenzyme B_{12}. At the 25 μg dose levels, retention, in decreasing order, was: coenzyme B_{12}, hydroxycobalamin, methylcobalamin and cyanocobalamin; the retention with coenzyme B_{12} was significantly greater than that with cyanocobalamin.

4535 EFFECT OF SOME DRUGS ON SERUM LIPIDS AFTER FAT LOADING.

(E.) Brummer, P. (U. Turku Dept. Med., Finland) and V. Kallio. *Scand. J. Gastroenterol.* 6(3):245-248, 1971.

Subjects consisted of 44 male hospital patients most of whom had ischemic heart disease. After an overnight fast they received 200 ml of heavy cream containing 30-32% fat, and various serum parameters were measured at 2, 4, 6, 8 and 10 hr. Subjects also received either 1,200 IU lipase P-3, 0.5 g of dried bovine bile extracts and 0.1 g of dehydrocholic acid; 5 g of sitosterol, dissolved in sorbitol; or 1 g of calcium gluconate, dissolved in 100 ml of water. Compared with a similar 10-hr control period for each subject, none of these agents had any effect on serum optical density at 620 mμ, total lipids, triglycerides or phospholipids.

4536 RADIOAUTOGRAPHIC OBSERVATIONS ON IRON ABSORPTION BY THE NORMAL MOUSE DUODENUM.

(E.) Bédard, Y. C. (U. Toronto Dept. Pathol., Ontario, Canada), P. H. Pinkerton and G. T. Simon. *Blood* 38(2):232-245, 1971.

The process of duodenal iron absorption was studied in mice using ^{55}Fe as a tracer and high-resolution radioautography. The iron absorption occurred in 2 phases, the first of which occurred over the first 3 hr. It was characterized by rapid iron uptake by the cell with the number of spots over the brush border, terminal web, and rough endoplasmic reticulum and adjacent cytoplasm reaching a maximum within 1 hr. Transfer of iron to the lamina propria was rapid, being maximal within 5 min. Between hr 1 and 3 there was a sharp decline in the number of spots in the aforementioned areas indicating the passage of iron from the cell to the vessels of lamina propria. The second or slow phase took place between 3 and 24 hr with the number of spots over the brush border being low and the uptake of iron by the cell being negligible. The iron remaining in the cell appeared mainly in areas rich in rough endoplasmic reticulum and free ribosomes. Lysosomes and ferritin played a relatively minor role in the retention of iron in the cell. At no time was any radioactive iron observed over the mitochondria, nuclei, or Golgi zones.

4537 CORRELATION BETWEEN (Na^+-K^+)-ACTIVATED ATPase ACTIVITIES AND THE RATE OF ISOTONIC FLUID TRANSPORT OF GALLBLADDER EPITHELIUM.

(E.) Van Os, C. H. (U. Nijmegen Dept. Physiol., Netherlands) and J. F. G. Slegers. *Biochim. Biophys. Acta* 241(1):89-96, 1971.

The correlation between (Na^+-K^+)-ATPase activities and the rate of isotonic fluid transport of gallbladder epithelium was studied in rabbit and guinea pig whole gallbladder homogenates. In both species there was a correlation between the absolute (Na^+-K^+)-ATPase activities and the rate of fluid transport. The ratio of cation transport to hydrolysis of ATP was 2:0 and 1:4 for guinea pig and rabbit, resp. In individual gallbladders the rate of fluid transport varied from 40 to 140 μl H_2O/cm^2 which was correlated with (Na^+-K^+)-ATPase activity. The rate of fluid transport was increased and the (Na^+-K^+)-ATPase system was stimulated by the administration of 10^{-9}M oubain and 1.5 mM K^+ to rabbit gallbladder homogenates. Thus the (Na^+-K^+)-ATPase system may play an important role in transcellular isotonic fluid transport in the gallbladder.

4538 ABSORPTION OF $Hg^{203}Cl_2$ FROM LIGATED INTESTINAL SEGMENT IN THE RAT *IN VIVO*.

(E.) Cikrt, M. (Inst. Indust. Hyg. Occupat. Dis., Prague). *Int. Arch. Arbeitsmed.* 28(1):12-25, 1971.

The absorption of ^{203}Hg by ligated intestinal segments and the initial distribution of metal in the organism was studied in rats using Na_2-ethylene diaminotetraacetic acid, diethylenetriaminopentacidic acid, dimercaptopropanol (BAL) and l-cystein hydrochloride complexes. A significant decrease in ^{203}Hg absorption was observed following the administration of any of the ^{203}Hg complexes used. A corresponding decrease in liver, kidney and plasma levels of ^{203}Hg was measured at the end of the experiment. No significant differences were observed between absorption in proximal and distal intestinal segments. A higher percentage of absorption was observed in these *in vivo* experiments than previously reported in *in vitro* studies. Hg^{203} complex with cystein, which has the lowest molecular weight of all the complexes studied, approached the values of absorption of $Hg^{203}Cl_2$ administered alone.

4539 DAILY RHYTHMIC CHANGE IN THE TRANSPORT OF HISTIDINE BY EVERTED SACS OF RAT SMALL INTESTINE. (E.) Furuya, S. (Natl. Inst. Anim. Indust., Chiba, Japan) and Y. Yugari. *Biochim. Biophys. Acta* 241(1):245-248, 1971.

Daily rhythmic changes in the intestinal transport of histidine by everted sacs of rat small intestine were measured in rats on various feeding schedules. L-histidine transport activity in rats fed ad libitum under conventional lighting was high during the night and low in the early morning. The rhythmic changes in histidine transport were not observed with the D-isomer. Rats fed during the daytime from 9 A.M. to 3 P.M. every day for 3 weeks (adapted to daytime feeding) showed maximal histidine transport at 6 A.M. and minimal transport between 9 P.M. and midnight. When rats were starved after 1 week of feeding from 6 P.M. to 6 A.M., the L-histidine transport activity cycle was the same as for the previous week for at least 1 day.

4540 STIMULATION OF BASIC AMINO ACID UPTAKE BY CERTAIN NEUTRAL AMINO ACIDS IN ISOLATED INTESTINAL EPITHELIAL CELLS. (E.) Reiser, S. (Indiana U. Sch. Med., Indianapolis) and P. A. Christiansen. *Biochim. Biophys. Acta* 241(1):102-113, 1971.

The effect of neutral amino acids on the uptake of lysine by everted sacs of rat intestine and the mechanism of the effect were studied. The addition of leucine (1 mM), methionine (1 mM) or alanine (1 mM) to the mucosal medium stimulated the uptake of 1 mM lysine while the intracellular accumulation of lysine was unaffected. While leucine, methionine, alanine and phenylalanine stimulated lysine and arginine uptake, isoleucine and tryptophan inhibited and valine, histidine and glycine did not affect the uptake of these 2 amino acids. When intestinal epithelial cells were incubated with lysine, arginine, or leucine the addition of lysine was followed by an increased uptake. In the absence of extracellular Na^+, the uptake of lysine by leucine-preincubated cells was not significantly reduced. Two transport systems seem to play a role in the amino acid interaction: the Na+-dependent, energy-dependent, concentrative and structurally specific neutral amino acid system, and a second which mediates a Na+-independent hetero-exchange between intracellular leucine and extracellular amino acids.

4541 INTRACELLULAR ACCUMULATION AND PERMEABILITY EFFECTS OF SOME WEAK ACIDS IN THE ISOLATED FROG GASTRIC MUCOSA. (E.) Flemström, G. (U. Uppsala Biomed. Ctr., Sweden). *Acta Physiol. Scand.* 82(1):1-16, 1971.

The effects of some weak acids on H^+ accumulation and secretion by the isolated frog gastric mucosa were studied. Administration of 10 mEq/liter of acetate, propionate or L-lactate caused a stimulation of H^+ secretion. These acids migrated rapidly into the acid secreting cells when the pH on the mucosal side was 4.0, thus the acids were undissociated. At a concentration of 100 mEq/liter, undissociated propionate or acetate which apparently accumulated in the acid secreting cells increased the ion permeability of the gastric mucosa. Thus, the intracellular accumulation of undissociated weak acids may account for their transiently persistent effect on the mucosal permeability to ions in the intact mammalian gastric mucosa.

4542 INFLUENCE OF BILE SALTS ON INTESTINAL SUGAR TRANSPORT IN VIVO. (E.) Gracey, M. (U. Birmingham Inst. Child Health, England), V. Burke and A. Oshin. *Scand. J. Gastroenterol.* 6(3):273-276, 1971.

In female adult Wistar rats, a 20 cm length of upper jejunum was used for the in vivo measurement of transport of sugars during infusion of bile salts. Without added bile salts, when 10 mM arbutin (nonmetabolized analogue of glucose) was used as substrate, transport was 2.02 µmoles/cm, while with 10 mM D-glucose, transport rate was 3.12 µmoles/cm, and this difference was significant. With the addition of 10 mM taurocholate to the perfusion medium, there was no significant effect on transport of arbutin (1.9 µmoles/cm) but there was an almost significant increase in transport of D-glucose (2.75 µmoles/cm). The addition of 1 mM deoxycholate caused a very marked and very significant decrease in transport of arbutin (0.89 µmoles/cm) and a very significant but less marked decrease in glucose transport (2.38 µmoles/cm).

4543 COLONIC SECRETION OF WATER AND ELECTROLYTES INDUCED BY BILE ACIDS: PERFUSION STUDIES IN MAN. (E.) Mekhjian, H. S. (Ohio State U. Dept. Med., Columbus), S. F. Phillips and A. F. Hofmann. *J. Clin. Invest.* 50(8):1569-1577, 1971.

The effect of bile acids on electrolyte and water absorption in the human colon was studied by colonic perfusion with isotonic electrolyte solutions with or without added bile acids. Perfusion with control solutions always resulted in absorption of Na^+, Cl^-, K^+, and water. While cholic acid had no influence on water and electrolyte movements, deoxycholic acid (3 mM) and chenodeoxycholic acid (5 mM) induced secretion or inhibition of Na^+, K^+, and water absorption. Similar inhibition followed perfusion with mixture of glycine or taurine conjugated bile acids. A positive correlation was observed between Na^+ and Cl^- secretion and secretion of water following bile acid perfusion. No such relationship existed between K^+ and water.

4544 EFFECT OF DRUGS ON CALCIUM ABSORPTION. STUDIES OF VARIOUS DRUGS. (Ger.) Sack, H. (Ruhr U. Essen Clin., Bochum, Germany). *Nucl. Med. (Stuttg.)* Suppl. 8:403-406, 1970.

After p.o. administration of various calcium salts and an effervescent tablet containing 625 mg $CaCl_2$, 1 g vitamin C, and 300 IU vitamin D_2, intestinal Ca^{++} absorption was measured in more than 370 patients by the double isotope method. Until age 70, when Ca^{++} absorption decreased abruptly, Ca^{++} absorption did not change much with age; neither sex nor time of the day had any effect on Ca^{++} absorption. Vitamin D increased Ca^{++} absorption. Although the percentage of Ca^{++} absorbed decreased with increasing doses, the absolute quantity absorbed increased. Ca^{++} absorption was highest with the effervescent tablet followed by $CaCl_2$, $CaCO_3$, $Ca_3(PO_4)_2$, and calcium citrate. When administered before breakfast, Ca^{++} absorption was about 50% higher than when it was given with breakfast.

4545 MEMBRANE POTENTIAL OF RAT LIVER CELLS AT VARIOUS AGES. (Ger.) Erdmann, C. (Friedrich Schiller U. Physiol. Inst., Jena, Germany) and M. Wunderlich. *Acta Biol. Med. Ger.* 25(2):239-242, 1970.

Liver cell membrane potentials, measured with a glass microelectrode on male Wistar rats, increased with age from 44.7 millivolts in 2-week-old rats to a maximum of 53.4 millivolts at 6 months, and then decreased again, reaching 50.5 millivolts in 3-yr-old rats. Values for adult rats are significantly higher than those in young rats and old rats. These findings indicate that liver cells mature more rapidly than muscle fibers in rats.

4546 THE EFFECT OF SOME DRUGS ON p-AMINOHIPPURATE AND XYLOSE TRANSFER THROUGH ISOLATED RAT INTESTINE. (E.) Giorgi, G. (U. Siena Dept. Pharmacol., Italy). *Pharmacol. Res. Commun.* 2(4):285-296, 1970.

The effect of antibiotics, Ca-chelating agents and metabolic inhibitors on p-aminohippurate (PAH) and xylose transfer through isolated rat intestine was studied using compartmental analysis. While penicillin inhibited xylose translocation, tetracycline inhibited the transfer of both PAH and xylose. Ouabain blocked xylose transfer, but ethylendiamine tetracetic acid (EDTA) promoted the transfer of both PAH and xylose. Phloridzin, 2,4-dinitrophenol, sodium azide salicylate and iodoacetate inhibited xylose translocation but had no significant effect on PAH transfer. Dimethyl sulfoxide (DMSO) decreased PAH and xylose translocation at higher concentrations (2.64 and 3.6 M) but at lower concentrations (0.53 and 1.23 M) it increased PAH absorption. The results of these kinetic studies of intestinal absorption seem to be in agreement with the most recent biochemical and biophysical studies of intestinal absorption.

4547 STEROLS IN THE SMALL INTESTINE OF THE RAT, GUINEA PIG, AND RABBIT. (E.) McIntyre, N. (Roy. Free Hosp., London), K. Kirsch, J. C. Orr and K. J. Isselbacher. *J. Lipid Res.* 12(3):336-346, 1971.

Homogenized extracts were used to study the levels of sterols in the small intestinal mucosa of rats, rabbits, and guinea-pigs. A large part of the intestinal sterols were found to be noncholesterol sterols, consisting of plant sterols derived from the diet and animal sterols, especially lathosterol, which are dietary precursors of cholesterol. The noncholesterol sterol content differed among the 3 species and there were marked variations at different levels of the small intestine in the same animal. Discriminatory uptake of sterols is suggested by the disproportionately large percentage of camposterol compared with β-sitosterol. Sterol composition of small intestinal intraluminal contents in the rat was studied by ultracentrifugational separation into an aqueous, micellar, component and a sedimentary component. These studies showed the major site of cholesterol absorption to be the upper part of the small intestine. Most of the intraluminal sterols localized in the ultra-sediment.

4548 AN EVALUATION OF FOUR METHODS FOR MEASURING CHOLESTEROL ABSORPTION BY THE INTESTINE IN MAN. (E.) Quintao, E. (U. Sao Paulo Sch. Med., Brazil), S. M. Grundy and E. H. Ahrens, Jr. *J. Lipid Res.* 12(2):221-232, 1971.

In method I, exogenous cholesterol absorbed daily is calculated from the measurement of daily fecal total neutral steroids following radioactive cholesterol administration i.v. Method II employs continuous oral labeling with radioactive cholesterol. With method III, which also makes use of constant oral labeling with radioactive cholesterol, it is theoretically required that the isotopic steady state be attained. In method IV, the absorption of dietary cholesterol was calculated following oral administration of a single dose of radioactive cholesterol and was calculated as the percentage of the dose not recovered in feces. Method IV was the simplest and most rapid of all methods and required only a very small amount of radioactivity. Method II was superior to all others in precision and reproducibility, unabsorbed dietary cholesterol being calculated directly and with great precision because of the major proportion of excreted radioactivity residing in that fraction. Also no correction need be made for undefined lags in transit of intestinal contents. Method I had disadvantages including: increased administration of radioactivity making subsequent measurements unreliable as well as prerequisite measurement or assumption of the intestinal content transit time. Method III had the fewest advantages, due mostly to the difficulty in attaining isotopic steady state.

4549 EFFECT OF BLOOD FLOW ON ABSORPTION OF UREA, METHANOL, AND ETHANOL IN THE RAT JEJUNUM. (Ger.) Winne, D. (U. Tubingen Pharmacol. Inst., Germany) and J. Remischovsky. *Naunyn Schmiedebergs Arch. Pharmacol.* 268(4):392-416, 1971.

The lumen of jejunal loops in anesthetized male Wistar rats were perfused with buffered isotonic saline solutions containing ^{14}C-labeled urea, methanol, or ethanol. When intestinal blood flow was reduced from 1.8 to 0.23 ml/min/g of tissue (wet weight) by removing 2-3 ml of blood, the levels of both alcohols in intestinal venous blood doubled and the level of urea increased 4.3-fold, but the rate at which these substances appeared in the blood decreased to 1/3 of the original value for the alcohols and to 2/3 of the original value for urea. The alcohol concentration of the serosal perfusion fluid increased by 23-26% while the urea concentration increased by only 7%. With decreased blood flow the rate at which these substances disappeared from the intestinal lumen decreased by 30% (urea), 46% (methanol), and 39% (ethanol). When blood flow was increased from 0.21 to 1.6 ml/min/g by infusing blood, venous blood concentrations decreased for all 3 substances, but the rate at which they appeared in the blood increased 1.8-fold for urea, 3-fold for methanol, and 3.6-fold for ethanol. The concentrations of both alcohols decreased by 8-9% in the perfusion fluid while no change occurred in the urea concentration. The rate at which these substances disappeared from the intestine increased 1.2-1.3-fold for the alcohols and remained unchanged for urea. With both increases and decreases in blood flow more of these substances disappeared from the intestine than appeared in the blood.

4550 PHARMACOKINETICS OF ABSORPTION WHEN AN INTESTINAL LOOP IS PERFUSED AND BLOOD FLOW IS VARIED. (Ger.) Winne, D. (U. Tubingen Pharmacol. Inst., Germany). *Naunyn Schmiedebergs Arch. Pharmacol.* 268(4):417-433, 1971.

Two 4-compartment mathematical models were developed to describe the relation between intestinal blood flow and the disappearance of a substance from the intestinal lumen and its appearance in intestinal venous blood and in serosal perfusion fluid. In both models the compartments consist of the intestinal lumen, interstitial space, serosal perfusion fluid, and blood. In simplified model A it is assumed that the lumen and interstitial space are thoroughly intermixed, that the radial transport of substances in the capillaries occurs so quickly that it is not a limiting factor, and that the volume of the serosal perfusion fluid is so large that concentrations of substances in it remain constant throughout the experiment. To more closely approach actual conditions, model B does not postulate that there is complete mixing in the interstitial space. After a substance passes through the epithelium, it diffuses perpendicular to the axis of the intestinal loop towards the serosa. In this model the interstitial space consists of all tissue from the base of the epithelium to the serosa. The intestinal wall is drained by a network of capillaries which are of the same thickness throughout. The resistance to diffusion is uniform in the second compartment, and the serosa does not provide any additional resistance. In the stationary state concentrations decrease nonlinearly from the base of the epithelium to the serosa.

4551 SODIUM CHLORIDE ABSORPTION AND SOLUTE-LINKED WATER FLOW ACROSS THE EPITHELIUM OF THE COPRODEUM AND LARGE INTESTINE IN THE NORMAL AND DEHYDRATED FOWL (Gallus domesticus). IN VIVO PERFUSION STUDIES. (E.) Bindslev, N. (U. Copenhagen Inst. Med. Physiol.) and E. Skadhauge. *J. Physiol. (Lond.)* 216(3):753-768, 1971.

4552 IONIC DEPENDENCE OF PROTEIN TRANSPORT ACROSS THE NEWBORN PIG INTESTINE. (E.) Smith, M. W. (A.R.C. Inst. Anim. Physiol., Cambridge, England). *J. Physiol. (Lond.)* 214(2):349-363, 1971.

4553 EFFECT OF LOW SODIUM DIET ON THE INTESTINAL ABSORPTION OF CALCIUM IN RATS. (E.) Cuisinier Gleizes, P. (INSERM Ctr. Study Metabol. Dis., Paris) and H. Mathieu. *Rev. Eur. Etud. Clin. Biol.* 16(3):273-277, 1971.

4554 ABSORPTION AND ENTEROHEPATIC CIRCULATION OF NEUTRAL STEROIDS IN THE RAT. (E.) Eriksson, H. (Karolinska Inst., Stockholm). *Eur. J. Biochem.* 19(3):416-423, 1971.

4555 MECHANISMS OF DIPEPTIDE UPTAKE BY RAT SMALL INTESTINE IN VITRO. (E.) Cheng, B. (Westminster Med. Sch., London), F. Navab and M. T. Lis. *Clin. Sci.* 40(3):247-259, 1971.

4556 INTESTINAL TRANSPORT OF ELECTROLYTES, AMINO ACIDS AND SUGARS. (E.) Armstrong, W. M. (Indiana U. Sch. Med., Indianapolis) and A. S. Nunn, Jr. Charles C. Thomas, Springfield, Ill., 1971, 352 pp.

4557 THE MEASUREMENT OF INTESTINAL CALCIUM ABSORPTION BY EXTERNAL RADIOISOTOPE COUNTING: APPLICATION TO STUDY OF NEPHROLITHIASIS. (E.) Wills, M. R. (Roy. Free Hosp., London, England), E. Zisman, J. Wortsman, R. G. Evens,

C. Y. C. Pak and F. C. Bartter. *Clin. Sci.* 39(1):95-106, 1970.

4558 A STUDY ON THE RESORPTION OF ^{131}I FROM THE NORMAL AND PATHOLOGIC RECTUM. (Rum.) Keresztessy, A. K. (1st Surg Clin., Tirgu Mures, Rumania), A. Pupp and Z. Papai. *Rev. Med. (Tirgu Mures)* 16(3-4):302-304, 1970.

4559 THE EFFECT OF AGE AND VARIOUS DIETS ON FOLIC ACID ABSORPTION. (Pol.) Ziemlanski, S. (Inst. Nutr. Warsaw, Poland), M. Wartanowicz and M. Palaszewska. *Acta Physiol. Pol.* 22(2):241-247, 1971.

4560 FOLATE ABSORPTION FOLLOWING EXPOSURE OF ISOLATED INTESTINAL SEGMENTS TO SYNTHETIC PTEROYLPOLYGLUTAMATES OF VARIOUS CHAIN LENGTHS. (E.) Baugh, C. M. (U. ALabama Sch. Med., Birmingham), C. L. Krumdieck, H. J. Baker and C. E. Butterworth, Jr. *Am. J. Clin. Nutr.* 24(5):595-596, 1971.

See also numbers: 4510, 4592, 4608, 5288, 5309

561 RELATIONSHIP BETWEEN SIZE OF BOLUS AND THE ACT OF SWALLOWING ON ESOPHAGEAL
ERISTALSIS IN DOGS. (E.) Jordan, P. H., Jr. (VA
osp., Houston, Tex.) and E. H. Longhi. *Proc.
oc. Exp. Biol. Med.* 137(3):868-871, 1971.

ne role of the act of swallowing and the presence
f a bolus in the esophagus in the genesis of
sophageal peristalsis was studied in 4 mongrel
ogs. Peristaltic waves, in response to the in-
usion of water, occurred with greater frequency
nen the dogs were made to swallow than when they
ere not. Peristaltic waves did not occur unless
bolus of water was present in the esophagus.
ne volume of water required in the esophagus to
nduce a peristaltic wave when swallowing did not
ccur was twice the volume required if swallowing
id occur, independent of the infusion rate.
eristalsis did not occur when the size of the
olus was below a critical volume, even when it
as accompanied by swallowing.

62 STUDIES ON THE INTESTINAL RELAXATION PRODUCED BY DOPAMINE. (E.) Heilman,
D. and B. K. B. Lum (U. Hawaii Sch. Med.,
nolulu). *J. Pharmacol. Exp. Ther.* 178(1):
-72, 1971.

e effect of dopamine and other sympathomimetic
ines on the intestine were studied in the
olated rabbit jejunum and the intestinal
pamine content of several animal species was
mpared. Dopamine and norepinephrine stimulated
th alpha and beta receptors thus producing
testinal relaxation. These amines were less
sceptible to phentolamine blockade than
thoxamine, and less susceptible to blockade by
(2-isopropylamino-1-hydroxyethyl)methanesul-
nanilide (MJ-1999) than isoproterenol. When
pha and beta blockers were used simultaneously,
ere was a decrease in the response to dopamine
d norepinephrine. Pretreatment of the jejunal
gments with reserpine or cocaine reduced the
sponse to dopamine. Dopamine was the primary
techolamine in sheep but not in the rabbit
junum, and methoxamine stimulated the former
t relaxed the latter. In both sheep and
bbits, norepinephrine was 100 times more potent
an dopamine as an intestinal relaxant.

63 IN-VITRO MOTILITY STUDIES ON THE CANINE AND HUMAN EXTRAHEPATIC BILIARY TRACTS.
.) Toouli, J. and J. M. Watts (Prince Henry's
sp., Melbourne, Australia). *Aust. NZ J. Surg.*
(4):380-387, 1971.

e in vitro activity of the common bile duct,
e gallbladder and the choledochal sphincter of
e dog and the common bile duct of man were
udied and the histological appearance of the
mmon bile duct in the 2 species compared. All
rts of the extrahepatic biliary tract exhibited spontaneous rhythmical activity with a gradual change in the character of the spontaneous activity from one end of the biliary tract to the other. All parts of the extrahepatic biliary tract responded to parasympathomimetic (acetylcholine, acetyl-β-methylcholine) and sympathomimetic drugs (noradrenaline, adrenaline, isoprenaline hydrochloride, and 5-hydroxytryptamine). While the latter drugs produced variable responses, parasympathomimetic drugs produced a contraction of the gallbladder, common bile duct and the longitudinally and circularly oriented muscle of the choledochal sphincter, and an increase in the intraluminal pressure of closed segments of the duct. Small amounts of smooth muscle usually longitudinal in direction were found in both human and canine common bile ducts with most of it being near the duodenum and the least near the liver.

4564 PHYSIOLOGICAL DETERMINANTS OF LOWER ESOPHAGEAL SPHINCTER FUNCTION. (E.)
Lipshutz, W. and S. Cohen (U. Pennsylvania Hosp., Philadelphia). *Gastroenterology* 61(1):16-24, 1971.

The physiological characteristics of lower esophageal sphincter circular smooth muscle were studied in vitro and compared with gastric smooth muscle using material from opossums. In gastric strips, fundus, and antrum the active tension developed by each muscle increased, per unit increase in muscle length, until a peak active tension (Po) was developed at the optimal muscle length (Lo). The lower esophageal sphincter muscle developed a greater Po and required less stretch to reach its Lo. Responses to acetylcholine measured at Lo showed that the sphincter muscle developed greater tension to this agent and responded at a lower threshold dose. In response to norepinephrine and propanolol, the circular muscle from the lower esophageal sphincter developed a greater maximum active tension and responded at a lower threshold dose. The threshold for the lower esophageal sphincter muscle response to synthetic gastrin I occurred at a lower dose than recorded at the esophagus or stomach. The maximum active tension or peak response for each region to gastrin I was less than with acetylcholine or norepinephrine. No difference in response to KCl stimulation was observed between the areas. Thus, gastrin I may have an important role in determining lower esophageal sphincter function in vivo.

4565 CHANGES IN LOWER ESOPHAGEAL SPHINCTER PRESSURE DURING INSULIN-INDUCED
HYPOGLYCEMIA. (E.) Castell, D. O. (Naval Hosp., Philadelphia, Pa.). *Gastroenterology* 61(1):10-15, 1971.

Changes in lower esophageal sphincter pressure were measured during vagal stimulation of gastric acid secretion following insulin-induced hypoglycemia. In 5 normal subjects there was no change in sphincter pressure for the first 25 min following insulin injection (0.2 IU/kg), but with the development of hypoglycemia and increased gastric activity there was a rapid decrease in pressure. When, on a subsequent day, the test was repeated but with constant neutralization of the gastric contents by sodium bicarbonate, there was again no change in lower esophagus sphincter pressure during the first 25 min; however, during the hypoglycemic phase, consistent increases in pressure occurred. Similar studies performed in 5 patients having previous vagotomy and pyloroplasty showed increased lower esophageal sphincter pressure (despite the absence of gastric acid production) while studies in 5 patients with prior vagotomy and subtotal gastrectomy revealed no pressure increases. These results suggest that the release of gastrin during insulin-induced hypoglycemia is accomplished by a route other than the vagus nerve.

4566 THE ACTION OF METOCLOPRAMIDE ON HUMAN GASTRODUODENAL MOTILITY. (E.) Johnson, A. G. (Charing Cross Hosp. Med. Sch., London). *Gut* 12(6):421-426, 1971.

The effect of metoclopramide on gastroduodenal motility was studied in 8 symptomless volunteers and 15 patients who were under investigation for dyspeptic symptoms. Metoclopramide increased the strength of gastric antral contractions in all but one of the subjects when they were present during the basal period. In all cases the responses to metoclopramide depended on what contractions were occurring in the antrum and duodenum at the time of injection regardless of clinical diagnosis. While the rate of antral contractions was not significantly changed, the rate of duodenal contractions was altered and, if rapid, was reduced to near that of the antrum, each large contraction occurring after an antral contraction. Metoclopramide had little effect when there were no spontaneous contractions.

4567 ELECTRICAL ACTIVITY OF THE STOMACH AND UPPER INTESTINE. (E.) Daniel, E. E. (U. Alberta Dept. Pharmacol., Edmonton, Canada) and J. Irwin. *Am. J. Dig. Dis.* 16(7):602-610, 1971.

The electrical activity of the stomach and duodenum and the effect of acetylcholine (Ach) and catecholamines on this activity were studied in anesthetized dogs. While cutting of the muscle layers prevented the propagation of pacesetter potentials (PP) in the stomach, cutting the mucosa was without effect. When small doses of Ach (0.01-0.1 µg) were injected intraarterially into a segment of stomach muscle, a premature PP occurred; however, even large doses of Ach (1-10 µg) could not induce a premature PP closer than 2.8 seconds after another PP. Intraarterial injection of small amounts of Ach caused the propagation of the premature PP both in a normal and/or in a retrograde direction. Intraarterial injection of a small dose of epinephrine (.01-1 µg) in the stomach temporarily eliminated PPs distal to the injection, but following large doses of epinephrine (10 µg) activity began below the injection site and was propagated in a retrograde direction. These responses to Ach and epinephrine were not observed in the duodenum.

4568 ON THE NATURE OF THE OSCILLATIONS OF THE MEMBRANE POTENTIAL (SLOW WAVES) PRODUCED BY ACETYLCHOLINE OR CARBACHOL IN INTESTINAL SMOOTH MUSCLE. (E.) Bolton, T. B. (U. Oxford Dept. Pharmacol., England). *J. Physiol. (Lond.)* 216(2):403-418, 1971.

The effects of acetylcholine (Ach) and carbachol on the membrane potential of the smooth muscle of the guinea pig ileum was studied in isotonic and hypertonic solutions. In isotonic solution the slow potential component of the spontaneous bursts was increased in size and frequency by Ach. In hypertonic solution both carbachol and Ach administration was followed by a decrease in the membrane potential and the initiation of spikes and oscillations of the membrane potential (slow waves). Surgical denervation of the ileal tissue, treatment with tetrodotoxin, or treatment with ganglionic blocking drugs did not affect the response to carbachol. Hyperpolarization of the membrane abolished the slow waves in hypertonic solution, the rate of rise being proportional to the level of the membrane potential from which they arose. Although these slow waves were abolished by Na-deficient solutions the spikes were not. Slow waves may represent an inward current through a slow, Na-sensitive and voltage-dependent ion channel.

4569 SULFHYDRYL GROUP REAGENTS: EFFECT ON INTESTINAL SMOOTH MUSCLE. (E.) Stubbins, J. F. (Med. Coll. Virginia, Richmond) and P. M. Hudgins. *Experientia* 27(6):669-670, 1971.

The action of some sulfhydryl group reagents on the rat were studied in vitro to determine the presence or absence of sulfhydryl or disulfide groups on the muscarinic receptor. Dithiothreitol (DTT) had an inhibitory effect which was further decreased by N-ethylmaleimide (NEM) treatment. NEM alone caused a marked, dose-dependent reduction in acetylcholine (Ach) response that was not reversible. P-chloromercuribenzoate (PCMB) was less potent as an antagonist for Ach, but proved to be an irreversible inhibitor. Treatment with either PCMB or NEM followed by washing, reduced maximum responses to 10^{-3} M Ach to 72.2 ± 4.5% and 27.3 ± 6.4% of control, resp. Bromoacetylcholine (BAC) was found to be a reversible agonist with about 1/30th the activity of Ach. The muscarinic receptor on rat jejunum seems to lack a disulfide linkage in the vicinity of the Ach receptor site.

4570 THE EFFECT OF ATROPINE AND HEXAMETHONIUM IN COMBINATION ON THE LOWER OESOPHAGEAL SPHINCTER. (E.) Pedersen, S. A. (Univ. Hosp., Odense, Denmark), P. A. Nielsen and H. R. Sörenson. *Scand. J. Gastroenterol.* 6(Suppl. 9): 43-47, 1971.

The response of the gastroesophageal sphincter to the simultaneous administration of atropine (0.01 mg/kg) and hexamethonium bromide (1 mg/kg) was studied in 10 normal subjects. In all cases, treatment with atropine and hexamethonium was followed by a significant decrease in mean pressure reversal point with no change in the intragastric or intraesophageal pressures. The mean maximum sphincteric pressure was significantly reduced (from 18 to 10 mM Hg) by the blockade with these drugs. A significant correlation was observed between the initial maximum sphincter pressure and the reduction after blocking; thus, the absolute decrease upon blocking was more marked in cases where the maximum sphincter pressure was initially high.

4571 INTRACELLULAR RECORDING OF ELECTRICAL ACTIVITY IN SMOOTH MUSCLE OF THE COMMON BILE DUCT. (E.) Golenhofen, K. (U. Marburg Inst. Physiol., Marburg/Lahn, Germany), D. v. Loh and F. K. Lynen. *Experientia* 27(6):650-652, 1971.

Electrical activity in the smooth muscle cells of the common bile duct was studied in vitro using tissue from guinea pigs. During the 30 min adaptation period, all preparations developed spontaneous activity which showed similarities to that of isolated taenia coli. Smooth muscle of the bile duct showed a clear "second rhythm", but the potential oscillations of the second rhythm which triggered the spikes were relatively small in amplitute. The smooth muscle cells in the bile duct were strictly coupled and consequently acted as a functional unit. The basic membrane potential was found at -50 to -65 mV, and the spike amplitude reached values up to 75 mV. The activity was also modulated by a slower "minute-rhythm" which was combined with fluctuations in the basic membrane potential which led to an inhibition of spike discharges in the phase of high polarization and stimulated spike discharges in the depolarization phase.

4572 A VAGOSYMPHATHETIC PATHWAY CAPABLE OF INFLUENCING COMMON BILE DUCT MOTILITY IN THE DOG. (E.) Tansy, M. F. (Temple U. Sch. Dent., Philadelphia, Pa.), R. C. Mackowiak and R. B. Chaffee. *Surg. Gynecol. Obstet.* 133(2): 225-236, 1971.

The effects of stimulation of the central portion of the vagus nerve on biliary flow was studied in the dog to cast more light on the function of the extrahepatic biliary tract. High voltage stimulation (1 msec at a frequency of 30 hertz) of the abdominal vagus nerve was followed by an inhibition in the release of bile from the common duct. Similar effects were observed after stimulation of splanchnic efferents. Spinal cord transection, surgical removal of the splanchnic efferent or sectioning the afferent cervical vagus abolished the response. While atropine had no effect on the common duct response to sympathetic stimulation, dibenzyline blocked the decrease in bile flow. Common bile duct responses to epinephrine in all instances were similar to those with central cervical vagal stimulation. The observed decrease in bile flow was not due to respiration, gallbladder activity, duodenal activity, decreased liver bile formation, or changes in choledochal sphincter pressure. A reflex vagal inhibition of bile flow through paths in the spinal cord seems to exist in the dog.

4573 MECHANICAL AND ELECTRICAL ACTIVITY IN THE DUODENUM OF DIABETICS WITH AND WITHOUT DIARRHEA. PRESSURES, DIFFERENTIAL PRESSURES AND ACTION POTENTIALS. (E.) Drewes, V. M. (Arhus Municipal Hosp., Denmark). *Am. J. Dig. Dis.* 16(7):628-634, 1971.

The duodenal activity of diabetics with (7) and without (28) diarrhea was studied by simultaneous registration of intraluminal pressure variations, differential pressures and electrical action potentials. The number of pressure waves in diabetics with diarrhea was significantly greater than the number in diabetics without diarrhea both during fasting and after the test meal, but no difference could be demonstrated after prostigmine. The average height of the waves was greater during fasting and the motility was greater in diabetics with diarrhea. Many more purely negative differential pressure waves were seen in the diabetics with diarrhea. The average duration of the action potential bursts was longer after prostigmine than during fasting and after the test meal, but no differences were seen between the groups. The average time difference between the maximum height of the pressure waves and the maximum amplitude of the differential pressure wave was less in individuals with diarrhea.

4574 THE INTESTINAL MUCOSAL REFLEX IN THE UNANESTHETIZED DOG. (E.) Thomas, J. E. (Loma Linda U. Med. Sch., Calif.) and M. V. Baldwin. *Am. J. Dig. Dis.* 16(7):642-647, 1971.

The intestinal mucosal reflex as elicited by chemical stimuli of a physiologic character (HCl, soap, sodium desoxycholate, fresh dog bile) was studied in unanesthetized dogs and responses in the duodenojejunal area and in the midjejunum were compared. At the 2 sites distal to the point of stimulus injection, there was a prompt inhibition of tone and rhythmic activity, while at the proximal sites there was increased motility, regardless of the stimulating agent. No consistent difference was observed in responses from the 2 intestinal areas, or from neurally intact dogs versus those with vagotomy or vagotomy and splanchnicotomy. This response was observed to move downstream as soon as initiated, with decremental conduction being the rule. Occasionally, repetition of these phenomena was seen at the site of stimulation. Cooling the intestine to 10°C or lower between sites of stimulation and recording abolished the response.

4575 ADRENOCEPTOR FUNCTIONS IN THE CAT CHOLEDOCHODUODENAL JUNCTION IN VITRO. (E.) Persson, C. G. A. (Draco Co. Res. Labs., Lund, Sweden). *Br. J. Pharmacol.* 42(3):447-461, 1971.

The effects of α- and β-adrenoreceptor stimulating agents on the sphincter of Oddi and the duodenum were studied in 70 cats. Following the administration of adrenaline, noradrenaline, or tyranine there was an increase in the activity and tone of the sphincter musculature and a decrease in duodenal activity and tone. Tyramine was without effect when administered to sphincters of reserpinized cats. A decrease in spontaneous activity and tonus of the sphincter and diminution of flow through the sphincter were observed after isoprenaline or terbutaline treatment, however, these effects were blocked by propranolol. A quantitative comparison between the activity of isoprenaline and terbutaline revealed that the former was 2-18 times more active on the sphincter and 35-90 times more active on the duodenum. Isolated sphincters were unaffected by treatment with phenoxybenzamine, atropine, hexamethonium and tetrodotoxin indicating a similarity between this and in vivo preparations. Thus, α-adrenoreceptors seem to be active in sphincter contraction while β-receptors are active in sphincter relaxation.

4576 ACTION OF SOME ANTIBIOTICS ON THE EXTRA HEPATIC BILIARY TRACT. IX: CHLORAMPHENICOL. (E.) Benzi, G. (U. Pavia Dept. Pharmacol., Italy), L. Sanguinetti, C. Consonno, A. Ferrara and E. Arrigoni. *Arch. Int. Pharmacodyn. Ther.* 189(1):156-167, 1971.

The effects of chloramphenicol on the extrahepatic biliary tract were studied in vitro and in situ in dogs, guinea pigs and cats. Chloramphenicol (12.5 to 800 mg/ml) induced a relaxation of the bile duct, normal or hypertonized by barium chloride, carbachol, or histamine. At doses of 1.9×10^{-10} to 3.2×10^{-6} g/ml chloramphenicol increased the tone and the motility of the normal isolated gallbladder and when perfused through the terminal bile duct at 0.5 to 1024 mg/ml induced an increase in biliary flow. Chloramphenicol reduced the constrictive action of spiramycin and tetracycline on the isolated dog terminal bile duct. On the isolated guinea-pig gallbladder, spiramycin increased, while tetracycline, at least in part, antagonized the contracting action of chloramphenicol.

4577 ELECTRICAL ACTIVITY OF THE GASTRIC ANTRUM IN NORMAL HUMAN SUBJECTS. (E.) Monges, H. (North Hosp., Marseille, France) and J. Salducci. *Am. J. Dig. Dis.* 16(7):623-627, 1971.

The electrical activity of the gastric antrum was measured in 40 normal human subjects by means of electrodes inserted into the gastric muscular layers during surgical procedures. Two types of electrical activity were recorded; a slow periodic activity or basic electrical rhythm (BER), and intermittent bursts of fast spikes, occurring during the contraction. The most characteristic phenomenon of the BER was a triphasic complex which was reproduced periodically at a regular rhythm of 3/min. The triphasic complex was often followed by a slow potential variation of low amplitude. The propagation velocity in the proximal antrum was about 2 cm/sec. Fast spiking activity was composed of bursts of fast spikes of unequal amplitude which occured about 3-4 sec after the onset of the triphasic complex, and lasted for about 3-6 sec. The spike burst potentials were generally accompanied by a pressure wave which indicated the presence of a gastric contraction. Spike activity was proportional to the amplitude of the pressure wave.

4578 THE POSSIBLE ROLE OF CLOSE CONTACTS (NEXUSES) IN THE PROPAGATION OF CONTROL ELECTRICAL ACTIVITY IN THE STOMACH AND SMALL INTESTINE. (E.) Daniel, E. E. (U. Alberta Dept. Pharmacol., Edmonton, Canada), K. Robinson, G. Duchon and R. M. Henderson. *Am. J. Dig. Dis.* 16(7):611-622, 1971.

Jejunal or duodenal activity of healthy female dogs was measured during and after perfusion with hypertonic solutions and tissues were studied microscopically to determine the possible role of close contacts between smooth muscle cells (nexuses) in the propagation of control electrical activity. Intraarterial perfusion of hypertonic solutions uncoupled slow waves in the intestine, but this was not related to the breaking of nexal contacts. The number of nexuses per grid square was not decreased after hypertonic perfusion, or perfusion with solutions that were Ca-free and contained 1 mmole EGTA; however, recovery of electrical activity after hypertonic solutions seemed faster in the latter cases. After reserpinization (0.1 mg/kg i.v. for each of 3 days), larger volumes of hypertonic solutions were required to uncouple slow waves, but nexal connections remained intact. The release of endogenous norepinephrine may play a role in the uncoupling of slow waves in these experiments.

4579 ELECTROPHYSIOLOGICAL STUDIES ON GASTRODUODENAL JUNCTION OF THE GUINEA PIG. Fujii, Y. (Kyushu U. Fac. Med., Fukuoka, Japan). *Am. J. Physiol.* 221(2):413-420, 1971.

he characteristic feature of the spontaneous
ctivity in the longitudinal muscle of the
uinea pig pylorus was slow waves appearing
egularly at a frequency of 5-8/min and bursts
f spikes superimposed on the slow wave. The
irection of conduction was from oral to aboral.
lectrical activity at the gastroduodenal junction
nd proximal duodenum were similar to that in the
ylorus. In a few preparations, propagation from
he antrum to the proximal duodenum was blocked
t the gastroduodenal junction. In hypertonic
olution the spontaneous activity stopped, but
he action potential could be evoked in the
ylorus and duodenum by electrical stimulation.
he space constants of longitudinal muscle,
easured in hypertonic solution, were 0.5-1.0 mm
n the pylorus and 0.3-0.7 mm in the proximal
uodenum. Addition of tetraethylammonium or ex-
ess potassium increased the excitability of the
issue. Apparently, the pylorus and the duodenum
re electronically connected at the gastroduodenal
unction. Antral excitation, particularly slow
aves, can spread by local circuit current across
he junction into the duodenum, and the electronic-
lly spread potential then initiates the spikes.

580 EFFECT OF LYSINE-VASOPRESSIN ON MOTOR
ACTIVITY IN THE PROXIMAL COLON: IN VITRO
TUDY IN THE RAT. (Fr.) Le Goff, P. (Sch. Med.,
ours, France) and J. Thouvenot. *C. R. Soc. Biol.
Paris)* 164(10):2091-2093, 1970.

n vitro studies made on the first 3-4 cm of colon
rom male nonfasting rats showed that cyclic
ariations in the longitudinal tonus were obtained
nd haustrations which were propagated like
eristaltic waves appeared after addition of
ysine-vasopressin (0.001 or 6 U) to the bath or
njection of a saline solution containing 4×10^{-5}
lysine vasopressin directly into the intestinal
umen. This phenomenon lasted for 2-15 min and
s believed to be physiological.

581 SYNTHETIC GASTRIN AS A DUAL ADRENERGIC
BLOCKER. (E.) Kaul, P. N. (U. Oklahoma
oll. Pharm., Norman). *Am. J. Dig. Dis.* 16(2):
27-134, 1971.

entagastrin, a gastrin like peptide, exhibited
n α- as well as β-adrenergic blockade on various
solated preparations in vitro. The degree to
hich guinea pig tracheal chain relaxed due to
pinephrine was inhibited by the pentapeptide.
entagastrin showed a competitive blocking
ffect against the positive inotropic activity
f isoproterenol on an electrically driven guinea
ig ventricular strip. Pentagastrin also blocked
he chronotropic property of isoproterenol on
solated mouse atria. The peptide partially
locked the vasoconstrictor effect of epinephrine
s well as that of norepinephrine in the rabbit
ar preparation and in the rat hind quarter
erfusion. It is conceivable that in the
ollinger-Ellison Syndrome, which is characterized
y high circulating gastrin levels, there may also occur a secondary involvement of autonomic control of the cardiovascular system.

4582 SEPARATION OF VILLIKININ-LIKE SUBSTANCE FROM INTESTINAL MUCOSAL EXTRACT. (E.) Kokas, E. (U. North Carolina Sch. Med., Chapel Hill), J. L. Davis, III and W. D. Brunson. *Arch. Int. Pharmacodyn. Ther.* 191(2):310-317, 1971.

Paper strip electrophoresis with pyridine-acetate at pH 6.5 was performed on crude canine intestinal mucosal extract following desalting by column chromatography with the ion retardation resin AG11A8. A strongly ninhydrin positive fraction which in a dose of 1 mg/kg increased villous motility was isolated. Five ninhydrin-positive bands were separated from the mucosal extract, but only band III had a stimulatory effect on villous motility. The villous motility stimulating effect of band III was 20 times that of the mucosal extract. Amino acid analysis of the hydrosylate of the villous motility stimulating agent revealed the presence of aspartic acid, threoxine, serine, glutamic acid, glycine and alanine. This ninhydrin positive villous motility factor seems to be a villikinin-like substance.

4583 EFFECTS OF CINCHOPHEN ON GASTRIC ELECTRICAL ACTIVITY. (Jap.) Kasahara, K. (Gumma U. Sch. Med., Maebashi, Japan). *Kitakanto Med. J.* 20(4):255-261, 1970.

4584 THE MECHANISM OF SMALL INTESTINAL VILLOUS MOVEMENT IN THE PIGEON. (E.) Hooper, P. A. (Med. Sch., Birmingham, England) and R. Schneider. *Life Sci.* [*I*] 10(2):61-66, 1971.

4585 RELAXING RESPONSE TO TRANSMURAL STIMULATION OF ISOLATED TAENIA COLI OF THE CHIMPANZEE AND PIG. (E.) Rikimaru, A. (Tohoku U. Sch. Med., Sendai, Japan). *Tohoku J. Exp. Med.* 103(1):115-116, 1971.

4586 THEORETICAL PRINCIPLES AND TECHNIQUE OF MEASURING INTRAESOPHAGEAL PRESSURE IN INVESTIGATIONS ON THE RESPIRATORY MECHANICS. (Pol.) May, K. L. (2nd Intern. Dis. Clin. Warsaw, Poland). *Pol. Arch. Med. Wewn.* 46(1): 87-93, 1971.

4587 INHIBITORY EFFECT OF SMOKING ON THE LOWER ESOPHAGEAL SPHINCTER. (E.) Dennish, G. W. (Naval Hosp., Philadelphia, Pa.) and D. O. Castell. *N. Engl. J. Med.* 284(20): 1136-1137, 1971.

4588 NERVE MEDIATED RESPONSE OF THE GUINEA-PIG COLON IN SITU: ACTIVITY OF SOME ANTICHOLINERGIC DRUGS. (E.) Soldani, G. (U. Pisa Dept. Pharmacol., Italy), M. del Tacca, A. Giacomelli and C. Crema. *Arch. Int. Pharmacodyn. Ther.* 187(2):329-335, 1970.

4589 A CONCEPT OF MOTOR CONTROL BY THE PACESETTER POTENTIAL IN THE STOMACH AND SMALL BOWEL. (E.) Code, C. F. (Mayo Clin., Rochester, Minn.), J. H. Szurszewski and K. A. Kelly. *Am. J. Dig. Dis.* 16(7):601, 1971.

4590 THE SLOWING OF GASTRIC EMPTYING BY FOUR STRONG ACIDS. A SUMMARY. (E.) Hunt, J. N. (Guy's Hosp. Med. Sch., London) and M. T. Knox. *Am. J. Dig. Dis.* 16(7):641, 1971.

4591 ELECTROMYOGRAPHIC FINDINGS DURING PRESERVATION AND TRANSPLANTATION OF THE SMALL INTESTINE IN DOGS. (Jap.) Jonouchi, H. (Nihon U. Sch. Med., Tokyo). *Nippon Heikatsukin Gakkai Zasshi (Jap. J. Smooth Muscle Res.)* 6(4):270-289, 1970.

See also numbers: 4608, 4747, 4917

4592 THE EFFECTS OF AN INHIBITOR OF Na^{+}-K^{+}-ACTIVE TRANSPORT ON THE SECRETORY ACTIVITY OF RAT SUBMAXILLARY GLAND CELL CULTURES. (E.) Gallagher, J. T. (U. York Dept. Biol., England), J. C. Marsden and A. W. Robards. *Z. Zellforsch. Mikrosk. Anat.* 117(3):314-321, 1971.

The effects of alkali metal cation transport on the secretory activity of rat submaxillary gland cells were studied in vitro. Addition of ouabain (1 mM) to the culture medium was followed by extensive development of cytoplasmic vesicles limited by smooth endoplasmic reticulum and containing electron-opaque material. When [D-[1-^{14}C]-glucosamine was added to the culture medium at a concentration of 0.125 µCi/ml and left for 24 hr, over 16% of the added radioactivity was recovered in the form of nondiffusible mucosubstances. Although ouabain lowered the rate of secretion of radioactive mucosubstances from the cells, after 48 hr the same amount of radioactivity was eventually released. Puromycin inhibited protein synthesis thus decreasing the release of nondiffusible radioactivity from cultured cells.

4593 OBSERVATIONS ON THE EFFECTS OF LONGTIME ADMINISTRATION OF ASPIRIN AND CORTISONE ON THE SECRETION RATE AND CHEMICAL COMPOSITION OF SALIVA. (E.) Takeuchi, T., F. R. Steggerda and E. R. Ensrud (Carle Clin., Urbana, Ill.). *Gastroenterology* 61(1):69-76, 1971.

The effects of long time administration of aspirin and cortisone on the secretion rate and chemical composition of saliva from the submaxillary gland was studied in dogs. The concentration of mucin in saliva varied directly with the frequency of electrical stimulation of the chorda tympani up to 20 cycles/sec. The protein content of the saliva after pilocarpine stimulation was significantly less than with nerve stimulation with dosages up to 0.4 mg/kg body weight, above which there was little difference. Both aspirin (4 g/kg/day) caused a significant decrease in all 4 protein-bound carbohydrates studied (sialic acid, fucose, hexoses, hexosamines), the sialic acid fraction being the most sensitive and hexosamine the least. Cortisone (100 mg/day) caused a decrease in salivary fucose, hexoses, and hexosamines (less effect than with aspirin) but did not depress the sialic acid fraction. Total protein content and rate of saliva secretion were unaffected by aspirin or cortisone.

4594 PARACRINE CELLS IN THE GASTROINTESTINAL TRACT. (Sw.) Hakanson, R. (U. Lund Pharmacol. Inst., Sweden), C. Owman and B. Sporrong. *Nord. Med.* 85(6):169-174, 1971.

4595 AGE AND THE CELL CYCLE OF THE MOUSE ESOPHAGEAL EPITHELIUM. (E.) Thrasher, J. D. (UCLA Sch. Med., Los Angeles, Calif.). *Exp. Gerontol.* 6(1):19-24, 1971.

See also numbers: 5123, 5226

STOMACH

4596 SECRETORY FUNCTION OF THE STOMACH DURING VARIOUS PERIODS OF PREGNANCY. (Rus.) Lipovskii, S. M. (Inst. Obstet. Gynecol., Leningrad, USSR). *Fiziol. Zh. SSSR* 57(5): 744-748, 1971.

Under basal conditions the hourly output of gastric juice, total acidity, and concentration of free HCl were significantly higher in male guinea pigs than in females. Little difference was found in the pepsin concentration in males and females, but the gross output of proteolytic enzymes was significantly higher in males. In an overwhelming majority of females the output of gastric juice under basal conditions tended to increase, both during the first and second half of pregnancy; acid output decreased significantly during the second half of pregnancy and the pepsin concentration decreased significantly during the first half. In half of these guinea pigs the concentration of HCl and pepsinogen decreased significantly during the first half of pregnancy and again 1-4 days before delivery. The values for all of these parameters returned to their original levels on days 7-14 of lactation.

4597 THYROCALCITONIN: STIMULATION OF SECRETION BY PENTAGASTRIN. (E.) Cooper, C. W. (U. North Carolina Sch. Med., Chapel Hill), W. H. Schwesinger, A. M. Mahgoub and D. A. Ontjes. *Science* 172(3989):1238-1240, 1971.

In anesthetized pigs, thyroid venous effluent blood was completely and continuously collected from the surgically isolated in situ thyroid gland. When animals received injections or infusions of pentagastrin via the femoral vein at doses of 0.26 to 2.6 µg/kg (0.34 to 3.4 nmole/kg), there was a rapid, striking increase in the concentration of thyrocalcitonin determined by radioimmunoassay in the thyroid effluent plasma samples. This effect was seen 6-12 min after administration of pentagastrin and pretreatment baseline levels were regained within 30 min after a single injection or after cessation of infusion. The increase in secretion of thyrocalcitonin was 5- to 10-fold with 0.26 µg/kg and 20- to 40-fold with 2.6 µg/kg. Blood calcium concentrations remained unaltered. Infusion and injection of pentagastrin produced hypocalcemia before but not after, functional thyroidectomy. Blood phosphate levels also fell after the first injection of pentagastrin. Baseline levels of both calcium and phosphate were regained at about 3.5 hr. Little or no effect accompanied injections of secretin (1.6 IU/kg), betazole (0.5 mg/kg) or pancreatic glucagon (62.5 µg/kg).

4598 RENAL UPTAKE AND EXCRETION OF GASTRIN IN THE DOG. (E.) Clendinnen, B. G., W. D. Davidson (Harbor Gen. Hosp., Torrance, Calif.), D. D. Reeder, B. M. Jackson and J. C. Thompson. *Surg. Gynecol. Obstet.* 132(6):1039-1043, 1971.

In anesthetized mongrel dogs, synthetic human gastrin I was infused, after an initial loading dose of either 4 or 8 µg, along with inulin and paraaminohippurate into the brachial vein at a constant rate of either 8 or 16 µg/hr for 2 hr; renal vein and femoral artery blood samples were removed at 60, 80, 100 and 120 min and 20-min urine specimens were collected during these 3 intervals. In this group, the glomerular filtration rate was 59 ml/min/kidney and the effective renal plasma flow was 201 ml/min/kidney. The clearance of gastrin was 0.32 ml/min/kidney and the ratio of the mean clearances of gastrin/inulin was 0.0052. At both infusion rates, the serum concentration of gastrin varied from 168 to 1,117 pg/ml, but in each dog a plateau was achieved during the last hour of infusion. The mean renal gastrin uptake was 40% and the mean renal extraction of gastrin was 84 ml/min/kidney. Since the renal clearance of gastrin into the urine was only 0.32 ml/min/kidney and the renal gastrin extraction was 84 ml/min/kidney, only 0.4% of the gastrin extracted was excreted into the urine. The mean regression equation for the linear relationship between the arterial levels (X) and the arteriovenous difference (y) is given by: $y = -22.2 + 0.44X$. After nephrectomy, the basal serum gastrin levels increased significantly from 64 to 105 pg/ml, and the postinfusion level of serum gastrin increased significantly from 421 to 862 pg/ml.

4599 PURIFICATION OF ENTEROGASTRONE. (Jap.) Ichimura, M. (U. Tokyo Fac. Pharmaceut. Sci.). *Yakugaku Zasshi (J. Pharm. Soc. Jap.)* 91(2):245-251, 1971.

A new method for enterogastrone purification is presented which uses extracts from pig duodenum. Tannate purified enterogastrone concentrate was subjected to Sephadex G-100 column chromatography and eluted with 0.2 M acetic acid. This was followed by column chromatography on CM-cellulose. The resulting purified enterogastrone was able to inhibit gastric juice secretion at a rate 200 times that of the fraction resulting from preliminary purification.

4600 AN IMMUNOLOGICAL AND CHROMATOGRAPHIC COMPARISON OF HUMAN INTRINSIC FACTOR AND THE ACID-STABLE GASTRIC ESTERASE VI A. (E.) Rapp, W. (Univ. Med. Clin., Heidelberg, Germany), K. Goldmann and K. B. Taylor. *Clin. Exp. Immunol.* 9(1):11-20, 1971.

Human intrinsic factor (IF) and gastric acid-stable esterase (VI A) were examined by immunoelectrophoresis and double-gel diffusion. In gel diffusion studies, the esterase antigen migrated as a β_1/β_2-globulin, whereas the IF was situated more in the β_1 and α_2-region. Both antigens overlapped near the starting point, but only IF showed vitamin B_{12} binding. Both IF and VI A were eluted from a DEAE-Sephadex column at 0.05-0.075 M and pH 7.0. In gel filtration with G100 or G200 IF was eluted in a definite range which corresponded to its molecular weight (60,000) whether from neutralized gastric juice (NGJ) or from gastric mucosa (GM). No IF was eluted from acid gastric juice (AGJ). Lower molecular weight VI A was eluted with IF from NGJ but higher molecular weight VI A was eluted from GM in a range different from that for IF. Only the IF antigen bound vitamin B_{12}; however, this binding effect could be inhibited by autoantibody-containing pernicious anemia sera. VI A and IF are seemingly biochemically and immunologically distinct proteins.

4601 GASTRIC INTRINSIC FACTOR IN THE HUMAN FOETUS. (E.) Schwartz, M. (Glostrup Hosp., Denmark) and J. Weber. *Scand. J. Gastroenterol.* 6(Suppl. 9):57-59, 1971.

Twenty-eight fetuses from legal abortions were examined for the presence of gastric intrinsic factor using a radioimmunoassay. Intrinsic factor was found in all fetuses with a crown-heel length greater than 95 mm which corresponds to week 11 or 12 of fetal life. While intrinsic factor following delivery was found almost exclusively in the fundus and corpus parts of the stomach, a considerable amount of intrinsic factor was found in the pyloric region of the fetal stomach. The production of gastric intrinic factor seemingly begins several months before the substance can be presumed to be of any value to the individual.

502 A GASTRIC INHIBITORY POLYPEPTIDE II: THE COMPLETE AMINO ACID SEQUENCE.

(E.)
rown, J. C. (U. British Columbia Dept. Physiol.,
ncouver, Canada) and J. R. Dryburgh. *Can. J.*
ochem. 49(8):867-872, 1971.

e amino acid sequence of porcine gastric
hibitory polypeptide was elucidated by degrada-
on of the whole molecule, cyanogen bromide
agments, and tryptic peptides with chymotrypsin
d thermolysin. The sequence of the 43 amino
id residues was found to be: Tyr-Ala-Glu-Gly-
r-Phe-Ile-Ser-Asp-Tyr-Ser-Ile-Ala-Met-Asp-Lys-
e-Arg-Gln-Gln-Asp-Phe-Val-Asn-Trp-Leu-Leu-Ala-
n-Gln-Lys-Gly-Lys-Lys-Ser-Asp-Trp-Lys-His-Asn-
e-Thr-Gln. Similarities between the gastric
hibitory factor and porcine glucagon and
cretin were found to exist among the first 26
sidues. The molecular weight of the poly-
ptide, calculated from the amino acid composition,
5105.

03 THE EFFECT OF BROCRESINE (NSD-1055) ON THE HISTIDINE DECARBOXYLASE ACTIVITY IN E RAT GASTRIC MUCOSA.

(E.) Mesch, H. (U.
bingen Dept. Pharmacol., Germany) and K.-F.
wing. *J. Pharm. Pharmacol.* 23(7):506-508, 1971.

e effect of different routes of administration
d different concentrations of brocresine on
e histidine decarboxylase of the rat stomach
s studied. Brocresine (100 mg/kg) had no
fect on the histidine decarboxylase activity
the gastric mucosa whether administered p.o.
i.p. No effect was seen when brocresine was
ministered with 2-deoxy-D-glucose (100 mg/kg).
vitro, when brocresine was added to the
cubation medium with mucosa homogenate it
hibited a dose-dependent inhibition of the
stidine decarboxylase activity in the rat
omach. At concentrations of 1.3×10^{-8}, 4 x
$^{-7}$, and 4×10^{-6} M the % enzyme activity was
, 62, and 38%, resp. These results show an
hibition of gastric histidine decarboxylase
vitro, but not in vivo, thus indicating the
ability of brocresine to interfere with gastric
stamine biosynthesis.

04 EFFECTS OF OBSTRUCTIVE JAUNDICE ON GASTRIC ACID SECRETION IN THE DOG.

r.) Ectors, P. (Saint Pierre U. Hosp., Brussels,
lgium), J. R. Denuit, J. M. Limbosch and J.
Graef. *Arch. Fr. Mal. App. Dig.* 59(10-11,
ppl. 2):97-106, 1970.

stric acid secretion was measured with the
idenhain pouch technique under basal conditions
d during i.v. infusions of histamine hydro-
loride and porcine gastrin in 6 dogs whose
mmon bile ducts had been ligated. After the
set of obstructive jaundice, which occurred
6 days after surgery, basal and 24-hr gastric
cretion increased for 4-6 wk. During this
riod responses of acid secretion to histamine and particularly to gastrin increased. These increases in gastric secretion might be due to an increase in the mass of parietal cells, an increase in endogenous histamine or secretin levels in the blood, or the decrease or disappearance of an inhibitor regulating parietal cell activity. The second hypothesis is considered to be the most likely explanation. Within 15 days after ligature of the common bile duct, bile pigments appeared in the intestine again and stools regained their normal color. Gastric secretion decreased after 4-6 wk when progressive changes became evident in the condition of the animals.

4605 TISSUE-SPECIFIC INHIBITION OF CELL PROLIFERATION IN EMBRYONIC STOMACH EPITHELIUM IN VITRO.

(E.) Philpott, G. W. (Barnes Hosp., St. Louis, Mo.). *Gastroenterology* 61(6):25-34, 1971.

The possibility of a tissue-specific inhibitory feedback control of cell proliferation in the developing stomach mucosa was studied in vitro using stomach, intestine, and skin taken from chick embryos cultured with vinblastine. Stomach epithelium showed a significant suppression of proliferative activity in the presence of crude, aqueous stomach extract; however, this extract had no apparent effect on the other tissues examined. In another experiment, stomach muscle extract did not produce any significant suppression of mitotic activity in 8-day stomach epithelia in vitro, whereas the mucosal extract did. Heating the mucosal extract to 60°C for 1 hr destroyed the inhibitory effect on cell proliferation. The proliferative activity was not altered when hydrocortisone and/or adrenalin were added to the culture medium with or without mucosal extract.

4606 EFFECT OF SECRETIN ON SERUM GASTRIN AS MEASURED BY IMMUNOASSAY.

(E.) Hansky, J. (Monash U. Dept. Med., Melbourne, Australia), C. Soveny and M. G. Korman. *Gastroenterology* 61(1):62-68, 1971.

The effect of exogenous secretin injection on circulating immunoreactive gastrin was studied in 34 subjects undergoing routine secretin tests, to determine if there is any change in serum gastrin. Boots secretin (2 IU/kg) caused a fall in serum gastrin from a mean basal level of 44 pg/ml to 28 pg/ml at 10 min followed by a slight rise to 33 pg/ml and then a further fall to 25 pg/ml at 45 min. GIH secretin (from the Gastrointestinal Hormone Research Unit, Karolinska Institute, Stockholm) caused a fall in serum gastrin from a mean basal level of 60 pg/ml to 22 pg/ml at 15 min and 19 pg/ml at 30 min. Saline injection had no significant effect on serum gastrin. Thus, secretin may either suppress the release of gastrin or promote the excretion or increased metabolism of gastrin.

4607 PRESENCE IN RABBIT COLOSTRUM OF IgA AUTOANTIBODIES TO A GASTRIC ANTIGEN. (E.) Wise, R. D. (U. Illinois Med. Ctr., Chicago), E. A. Lichter and S. Dray. *J. Immunol.* 107(1): 47-55, 1971.

The relationship of colostral IgA to neonatal antigens was studied in rabbits to determine some of the immunologic activities of colostral IgA. Whey of rabbit colostrum contained IgA antibodies that precipitated specifically with an antigen present in the rabbit's own stomach tissue as well as that of their progeny and of unrelated rabbits, indicating that at least some of the IgA secreted in rabbit colostrum is autoantibody. Single diffusion experiments in agarose gel indicated that the reaction between the whey and the gastric antigen was immunologically specific. Whey obtained from a pseudopregnant virgin female rabbit precipitated with saline extracts of homogenized rabbit stomachs. Using immunoelectrophoresis, the gastric antigen was found to have a molecular weight similar to that of albumin, and to have a negative charge greater than that of albumin as indicated by its migration to the rho region.

4608 SELECTIVE VERSUS TRUNCAL VAGOTOMY. A COMPREHENSIVE STUDY OF FECAL NITROGEN AND FAT LOSSES. (E.) Crow, R. W., W. J. Schulte (VA Hosp., Wood, Wisc.), E. H. Ellison and D. H. Winship. *Am. J. Surg.* 121(6):684-688, 1971.

The changes in fecal fat and nitrogen excretion, body weight, and stool bulk were compared before and after selective and truncal vagotomy in 24 dogs using each animal as his own control. Body weight decreased after pyloroplasty alone or pyloroplasty with either type of vagotomy. Truncal vagotomy was followed by an increase in stool bulk; however, no significant change was seen after the selective procedure. While fecal nitrogen excretion increased only after pyloroplasty with truncal vagotomy, fecal fat excretion increased after pyloroplasty alone or pyloroplasty accompanied by either method of vagotomy. While nitrogen excretion was greater after truncal vagotomy than after selective vagotomy, the excretion of fecal fat was greater after selective vagotomy than after truncal vagotomy, when both were performed in the same animal, but nitrogen excretion was greater after truncal division. It was concluded that selective vagotomy has no great advantages over truncal division.

4609 A GASTRIC ACID INHIBITOR OF CEREBRAL ORIGIN. (E.) Reigel, D. H. (Med. Coll. Wisconsin, Milwaukee), S. J. Larson, A. Sances, Jr., N. E. Hoffman and K. J. Switala. *Surgery* 70(2):161-168, 1971.

Triple-lumen Delrin gastric cannulas were implanted in the stomach of 50 stumptail macaque (Macacca speciosa) monkeys. Following complete bilateral thoracolumbar sympathectomy (5 animals), there was essentially no alteration in the intragastric pH and gastric acid secretory rate. With the application of transcranial currents (mean of 7 milliamperes for 2.5 millisec) there was a marked reduction in the rate of acid secretion. In 5 monkeys subjected to complete section of the spinal cord at the levels of C_7-T_1, after recovery from surgery there was no change in gastric acid secretion, and the application of transcranial currents produced a reduction in acid secretion comparable to that seen in control and sympathectomized animals. In 4 completely vagomomized animals there was a decrease in basal acid secretion, but the response to transcranial currents was the same before and after vagotomy. In a single monkey with bilateral thoracolumbar sympathectomy and bilateral vagotomy, transcranial current was also followed by a marked reduction in acid secretion. In 5 animals with polyvinyl catheters placed in the superior vena cava, the i.v. injection of serotonin (0.2-25.0 mg/kg) produced a marked decrease in acid secretion; a dose of 10 mg/kg was necessary to reproduce the same decrease in acid secretion seen with transcranial currents. The inhibition of the maximum gastric acid response to histamine was 40% with i.v. atropine, 58% with i.v. serotonin, 71% with a crude preparation of lyophilized, dialyzed, achlorhydric juice containing the inhibitor and 85% with the third of four fractions eluted from the crude preparation on a Sephadex column.

4610 CHRONIC EFFECTS OF NICOTINE ON GASTRIC SECRETION IN VAGOTOMIZED RATS. (E.) Thompson, J. H. (UCLA Dept. Pharmacol., Los Angeles, Calif.) and M. Angulo. *Experientia* 27(4):404-405, 1971.

4611 A CONTRIBUTION TO THE METHOD OF RADIOLOGIC ESTIMATION OF HYDROCHLORIC ACID CONTENT IN GASTRIC JUICE IN CHILDREN. (Pol.) Nowak, S. (Med. Acad. 2nd Pediatr. Clin., Lodz, Poland), B. Kuchowicz and H. Chylinska. *Pol. Tyg. Lek.* 26(4):97-99, 1971.

4612 GASTRIC ACID OUTPUT STUDY IN EAST AFRICAN AND JAPANESE SUBJECTS. (E.) Dutt, B. (Makerere U. Coll., Kampala, Uganda), K. Nakamura and G. Ueda. *Tohoku J. Exp. Med.* 103(1):11-16, 1971.

4613 GASTRIC SECRETION IN INFANTS AND ITS MODIFICATION BY MILK AND ALKALIS. (Sp.) Solimano, G., P. Guerrero, O. Danus and I. Valenzuela. *Rev. Chil. Pediatr.* 41(8):810-815, 1970.

4614 A METHOD FOR THE MEASUREMENT OF THE PROTEOLYTIC ACTIVITY OF GASTRIC JUICE. (Rus.) Korotko, G. F. and L. M. Seidbaieva. *Lab. Delo* (1):34-36, 1971.

4615 PRELIMINARY RESULTS ON THE USE OF CERULEIN TO STUDY PANCREATIC FUNCTION IN MAN. (Fr.) Bonfils, S. (INSERM Bichat Hosp., Paris), J. Gislon and J. L. Junien. *Acta Gastroenterol. Belg.* 34(1):26-33, 1971.

Injection of cerulein (15 ng/kg) after infusion of secretin (3 U/kg) for 1 hr in 7 subjects with no evidence of gastrointestinal disease produced mean bicarbonate outputs in the duodenal juice of more than 200 μEq/min and increased maximum amylase concentrations 45-100% above initial values. The presence of amylase secretion before injection of cerulein might be due to impurities in the secretin or to "washing out". Amylase outputs increased in only 4 of these 7 subjects in whom bicarbonate continued to be secreted after discontinuation of the secretin infusion. When cerulein was infused with the secretin in 4 subjects, bicarbonate secretion continued and amylase outputs increased in all 4 subjects. The results obtained by using cerulein with secretin were similar to those obtained by using pancreozymin with secretin.

4616 HYDROLYSIS OF TRIGLYCERIDES BY PANCREATIC LIPASE: RATE OF FREE SATURATED AND UNSATURATED FATTY ACID PRODUCTION AS A FUNCTION OF TEMPERATURE AND CALCIUM CONCENTRATION. (Fr.) Parijs, J. (U. Ghent Academ. Hosp., Belgium), G. A. De Weerdt and F. Barbier. *Acta Gastroenterol. Belg.* 34(1):79-85, 1971.

Triglycerides, which had been extracted from human plasma purified by thin-layer chromatography, were incubated with pancreatic lipase in tris buffer (pH 8) in the presence of calcium chloride (0.55-2.2%) and sodium deoxycholate (0.05%). At 40° C with an incubation time of 10 min, monoglyceride production decreased and diglyceride production increased in the absence of $CaCl_2$. Diglyceride production also increased when lipase concentrations were decreased. At 50° C, 41% of the triglycerides were hydrolyzed to diglycerides, probably because lipase is progressively inactivated at this temperature. Gas chromatography of the methyl esters of fatty acids from monoglycerides and triglycerides demonstrated that lipase is specific for fatty acids esterified by the primary alcohol groups of glycerol. The diglycerides were of the α-β and not the α-α' type, indicating the lipase does not act on the β position. Unsaturated fatty acids were liberated a little more rapidly than saturated fatty acids.

4617 NORMAL HUMAN PANCREATIC SECRETION AS A FUNCTION OF AGE. (Fr.) Delachaume-Salem, E. (INSERM Res. Unit Dig. Pathol., Marseille, France) and H. Sarles. *Arch. Fr. Mal. App. Dig.* 59(10-11, Suppl. 2):135-146, 1970.

The composition of duodenal juice was studied in 40 infants, aged 2 to 36 months; in 22 children up to 16 yr of age; and in 140 adults for 15 min before and 45 min after injection of secretin (1 IU/kg i.v.) and pancreozymin (3 IU/kg). A closer correlation was obtained between the volume of duodenal juice and body surface than between the volume of duodenal juice and body weight. Maximum concentrations of lipase, amylase, trypsin, chymotrypsin, and bicarbonate increased significantly with age up to 2 to 3 yr and remained essentially unchanged thereafter. This increase was most pronounced for amylase, which was not found at all in newborns, and was smallest for trypsin. These increases are not due to the gradual disappearance of an inhibitor from the duodenal juice of newborns or to adaptation to food, but appear to be related to maturation of the pancreas which, in contrast to other species studied, is gradually attained during the first 2 yr of life in man.

4618 STUDIES ON PHOSPHOLIPASE A AND ITS ZYMOGEN FROM PORCINE PANCREAS. III. ACTION OF THE ENZYME ON SHORT-CHAIN LECITHINS. (E.) De Haas, G. H. (State U. Biochem. Lab., Utrecht, Netherlands), P. P. M. Bonsen, W. A. Pieterson and L. L. M. Van Deenen. *Biochim. Biophys. Acta* 239(2):252-266, 1971.

The kinetic parameters of porcine pancreatic phospholipase A as a function of different lipid-water interfaces, metal ions, ionic strength and pH were studied. Although phospholipase A is able to attack short chain lecithins in molecularly dispersed form and in the absence of emulsifiers, micellar solutions were hydrolyzed at a much higher rate. Of the 3 substrates examined (short chain lecithins with C_6, C_7 and C_8 fatty acid esters) dioctanoyllecithin appeared to be the best substrate, the interfacial area per molecule perhaps accounting for differences in maximal velocities. The enzyme absolutely required calcium ion at all pH values studied, suggesting a role of this metal ion in the fixation of phospholipase A to its substrates and/or in the reaction steps of the catalytic process itself. The substrate was found to combine with the enzyme independently of the metal ion concentration. Maximal binding of phospholipase A with diheptanoyllecithin was observed at pH less than 6, the affinity of the enzyme for calcium ion decreasing at pH values below 6.5. The addition of large amounts of NaCl (high ionic strength) to aqueous solutions of diheptanoyllecithin not only considerably lowered the critical micelle concentration, but also dramatically increased the enzyme activity at the same time. The activating effect of salt may be due to a change of the properties of the lipid-water interface e.g. a decrease in the charge-charge interactions of the interface due to the polar head groups.

4619 THE FLOW OF JUICE FROM THE PANCREATIC GLAND OF THE CAT IN RESPONSE TO VAGAL STIMULATION. (E.) Lenninger, S. (U. Lund Inst. Physiol., Sweden) and B. Ohlin. *J. Physiol. (Lond.)* 216(2):303-318, 1971.

The effect of vagal stimulation on pancreatic secretion was studied in cats before and after the administration of parasympatholytic agents and physostigmine (Eserine). In response to vagal stimulation pancreatic secretion of water, electrolytes and enzymes were observed, the effect being directly on the pancreas. Visible secretion usually started at 3 cycles/sec and maximal secretion was obtained with frequencies between 8 and 15 cycles/sec. Atropine caused a significant decrease in the protein concentrations of pancreatic secretion in response to vagal stimulation, while water secretion was unaffected. Eserinization of the pancreas had no effect on water secretion in response to submaximal vagal stimulation, but protein concentration was increased by eserine pretreatment. The maximum volume of pancreatic secretion following vagal stimulation was about 20% of that observed in response to exogenous secretin.

4620 PHOSPHOLIPASE A_1 ACTIVITY OF GUINEA PIG PANCREAS. (E.) White, D. A. (Johns Hopkins Med. Sch., Baltimore, Md.), D. J. Pounder and J. N. Hawthorne. *Biochim. Biophys. Acta* 242(1):99-107, 1971.

The properties of the phospholipase A_1 enzyme of fresh guinea pig pancreas homogenates and fractions were studied. Phospholipase A showed optimal activity at pH 6 and pH 8.5 when determined with 2-([1-^{14}C] linoleyl)-phosphatidylcholine, 1-([9,10-$^{3}H_2$]stearoyl)phosphatidylcholine, and [^{32}P]phosphatidylinositol. While both phosphatidylcholine and phosphatidylinositol were good substrates at pH 6.0, the rate of hydrolysis of the latter was 6 times that of the former (V_{max} = 129 µm/mg protein/hr). Whereas the addition of Ca^{++} to the incubation medium inhibited phosoholipase A1 activity, ethylenediamine tetraacetic acid (EDTA) had no significant effect on the hydrolysis of [^{14}C]phosphatidylcholine. The phospholipase A_1 activity was located in both mixed pellet and microsomal fractions with higher activity in the latter.

4621 THE INFLUENCE OF BILE AND PURE BILE SALTS ON PANCREATIC SECRETION IN MAN. (E.) Forell, M. M. (Univ. 2nd Med. Clin., Munich, Germany), M. Otte, H. J. Kohl, P. Lehnert and H. P. Stahlheber. *Scand. J. Gastroenterol.* 6(3):261-265, 1971.

In 62 patients without evidence of pancreatic disease who received simultaneous i.v. injection of 1 IU/kg of cholecystokinin-pancreozymin and 1 IU/kg secretin (Boots), there was found to be a highly significant logarithmic correlation between bile content (bilirubin) and both intestinal lipase and trypsin. There was also a significant correlation between intestinal nitrogen and both lipase and trypsin. There was essentially a 1:1 correspondence between intestinal bilirubin and intestinal nitrogen. The in vitro addition of bile to bilirubin-free duodenal aspiration samples showed no indication of enzyme activation. With exogenous administration of bile by intraduodenal application, there was a significant increase in intestinal volume and content of lipase and trypsin within 10 min, but not of bicarbonate after intraduodenal application of 6 g of cattle bile. Since the bile solution used in these studies was hypertonic, verification studies were done with 20 ml of a hypertonic solution of mannitol (1,097 mosmols/kg) via intraduodenal instillation and showed only a slight effect on volume output and none on the secretion of lipase or trypsin. Intraduodenal application of the sodium salt of glycocholic acid caused a significant increase in secretion of lipase and trypsin, while no bilirubin appeared in any duodenal sample. A similar but lesser effect was seen with the sodium salt of glycodehydrocholic acid while the greatest effect was seen with 3α-12α-dihydroxy-5β-cholanic acid, after which there was a highly significant increase in volume, bicarbonate and enzymes, with the appearance of a small amount of bilirubin in the duodenal content. Gylychocholic acid failed to elicit the response seen with its sodium salt.

4622 EXOCRINE PANCREATIC FUNCTION IN PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS. (E.) McEwan-Alvarado, G. (VA Ctr., Temple, Tex.), N. C. Hightower, Jr., L. R. Carney and C. W. Barrier, Jr. *Am. J. Dig. Dis.* 16(2):107-110, 1971.

Pancreatic exocrine function and intestinal absorption were assessed in 8 patients with amyotrophic lateral sclerosis (ALS) using secretin, pancreozymin, and ^{131}I-triolein. All 7 patients studied had normal pancreatic exocrine function. Serum lipase and amylase concentrations determined before and after secretin and pancreozymin in these patients were also normal. Measurement of fecal trioleins and fat indicated normal intestinal absorption in all but one patient who had a borderline value for fecal fat (g/24 hr.). Intubation of patients with ALS was found to be difficult, and errors in technic can easily be made. The use of pancreozymin when assessing pancreatic exocrine function seems to be an important factor.

4623 ROLE OF PANCREOZYMIN-CHOLECYSTOKININ AND STRUCTURALLY RELATED COMPOUNDS AS CALCITONIN SECRETOGOGUES. (E.) Care, A. D. (Rowett Res. Inst., Aberdeen, Scotland), J. B. Bruce, J. Boelkins, A. D. Kenny, H. Conaway and C. S. Anast. *Endocrinology* 89(1):262-271, 1971.

he role of pancreozymin-cholecystokinin and tructurally related compounds as calcitonin ecretogogues was studied in pigs with surgically solated thyroid glands which were perfused with arious solutions. Although porcine secretin 50 pM to 145 nM) had no effect on calcitonin ecretion, (measured by either radioimmunoassay r bioassay), porcine pancreozymin (1.3 to 25 nM) aused a significant increase in the secretion f calcitonin by the thyroid. While the C-terminal ctapeptide of pancreozymin (1.8 to 17 nM) was ore effective on a molar basis in eliciting alcitonin release than the whole molecule, the -terminal hexapeptide (70 nM) caused no signifiant stimulation of calcitonin secretion. Mild xidation of the C-terminal octapeptide with ydrogen peroxide brought about a 47% reduction n calcitonin secretion. Cerulein (1-14 nM) was ore active than pancreozymin on a molar basis ut comparable in biological potency with the -terminal octapeptide. Pentagastrin (0.5 nM) as also effective in evoking calcitonin release, ut less so than pancreozymin, the C-terminal ctapeptide, or cerulein.

624 BICARBONATE SECRETION OF THE PANCREAS IN MAN AFTER A SINGLE INJECTION OR ONTINUOUS PERFUSION OF SECRETIN.

(Fr.) Vagne, ., L. Descos (E. Herriot Hosp., Lyon, France), . Trepo, M. J. Aulagnier and C. Desvignes. *cta Gastroenterol. Belg.* 34(1):17-25, 1971.

n 78 normal men and woman and 19 male subjects ith chronic pancreatitis, duodenal ulcer, epatitis, and cirrhosis no significant differences ere found in the maximum values for duodenal uice volume and bicarbonate concentrations and utputs after a single rapid injection (3 IU/kg .v.) or a continuous infusion (3 IU/kg/hr i.v.) f secretin. The results were independent of the ethod by which secretin was administered. eflux of duodenal juice into the stomach was etected in 8 controls and in 4 patients. In he same subject bicarbonate concentrations emained about the same while there was great ndividual variation in the duodenal juice olume and bicarbonate output. This may be aused by escape of duodenal juice into the ejunum.

625 EFFECTS OF NUTRITIONAL AND HORMONE FACTORS ON THE ACTIVITY OF PHOSPHOLIPASE 2 IN THE PANCREATIC JUICE OF WAKING RATS.

(Fr.) elleville, J. (Sch. Sci., Dijon, France) and J. lément. *Arch. Sci. Physiol.* 25(1):59-83, 1971.

he outputs of bile and pancreatic juice and the rotein concentration of pancreatic juice emained at high levels until shortly before eath in nonanesthetized male Holtzmann rats iven only small quantities of sodium chloride nd sucrose or fed a low-fat, low-protein diet bread). The activity of phospholipase A_2 phosphatide acyl hydrolase) increased with ime. In most experiments perfusion of small doses of secretin increased outputs of bile and pancreatic juice, decreased the protein concentration of pancreatic juice, and increased the activity and output of phospholipase A_2. Large doses of secretin had essentially the same effect but increased the protein concentration of pancreatic juice in most animals. Perfusions of pancreozymin tended to decrease the output of pancreatic juice and to increase the bile output; the protein concentration of pancreatic juice increased and phospholipase A_2 activities tended to increase in most cases. Perfusion of extracts from the posterior pituitary (0.5 IU/kg/hr for 120 hr) decreased the output of pancreatic juice, the protein concentration, and protein output; phospholipase A_2 activities were increased in 16 of 26 experiments. Larger doses of pituitary extract (8 IU/hr for 1 hr) produced similar results but decreased the protein output. These findings indicate that the activity of phospholipase A_2 is not necessarily proportional to the concentration of protein in pancreatic juice.

4626 EFFECT OF PANCREOZYMIN ON RAT PANCREATIC ENZYME BIOSYNTHESIS.

(E.) Reggio, H. (Inst. Biol. Chem., Marseille, France), H. Cailla-Deckmyn and G. Marchis-Mouren. *J. Cell Biol.* 50(2):333-343, 1971.

Rats were subjected to i.v. perfusion with pancreozymin and/or secretin at the rate of 0.75 Ivy dog-U/kg/hr for 4 hr after which the pancreas and liver were removed. In the pancreas, neither the amylase nor the total protein levels were significantly altered by infusion of pancreozymin or secretin alone; when both were infused together, there was a 50% decrease in amylase level while there was a slight increase in protein. No significant changes were seen in liver protein levels. When both were infused together, there was a gradual decrease in pancreatic amylase or total protein levels which reached the minimum at 4 hr and then began to increase gradually. In rats perfused with secretin alone for 4 hr there was no significant change in the morphology of the zymogen granule-laden acinar cells; after 4 hr of perfusion with pancreozymin-secretin, there was a marked reduction in the number of zymogen granules and a marked increase in the size and number of Golgi vacuoles and of prozymogen granules. Some rats were injected i.v. with ^{14}C-L-valine 10 min before death. At the end of 4 hr, there was no hormonal stimulation of incorporation of valine into liver protein but there was an 8- to 10-fold increase of label in pancreatic amylase and protein after infusion with pancreozymin alone or with pancreozymin-secretin, but not with secretin alone; the addition of secretin did not augment the effect seen with pancreozymin alone. In this situation there was a rapid rise of incorporation of label which reached a plateau after 2 hr. This stimulatory effect was not abolished by doses of actinomycin D sufficient to inhibit 90-95% of RNA synthesis.

4627 DEPLETION OF EXOCRINE PANCREATIC SECRETION IN MAN. (Ger.) Diwok, K. (U. Rostock Med. Clin., Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 30(4):247-257, 1970.

Studies of duodenal juice from 55 subjects with normal pancreatic secretion revealed that repeated stimulation tests with methacholine chloride (0.015 mg s.c.) and secretin (92 U) did not cause depletion in pancreatic enzyme or bicarbonate secretion. Methacholine chloride significantly increased proteinase, lipase, and amylase activities while secretin decreased them because of a dilution effect. Similar changes occurred in proteinase and amylase activities after 2 and 3 tests given at 30-min intervals; the increase in lipase activity was not significant. Although the first injection of methacholine chloride caused only a slight increase in the volume of duodenal juice and its bicarbonate concentration, the first dose of secretin increased both parameters significantly. The volume of duodenal juice increased significantly during the second test, but after this both duodenal juice volume and its bicarbonate concentration remained at their maximum levels. These findings suggest that repeated tests with methacholine chloride and secretin may be of value in diagnosing pancreatic insufficiency in patients who respond normally to the first test.

4628 THE ROLE OF THE EXOCRINE PANCREAS IN THE STIMULATION OF INSULIN SECRETION BY INTESTINAL HORMONES. I. THE EFFECT OF PANCREOZYMIN, SECRETIN, GASTRIN-PENTAPEPTIDE AND OF GLUCAGON UPON INSULIN SECRETION OF ISOLATED ISLETS OF RAT PANCREAS. (E.) Hinz, M. (U. Ulm Intern. Med. Ctr., Germany), N. Katsilambros, B. Schweitzer, S. Raptis and E. F. Pfeiffer. *Diabetologia* 7(1):1-5, 1971.

Pancreozymin effected insulin release from rat isolated pancreatic islets both in the absence, and, supporting insulin secretion, in the presence of 5.5 and 11 mM glucose in the medium. Glucagon took an intermediate position, stimulating glucose-induced insulin release, but not affecting insulin secretion without glucose in the medium. No significant stimulation of insulin release from the islets was observed following secretin and gastrin-pentapeptide, neither in the presence nor in the absence of glucose in the medium. After subjecting isolated islets to multiple pulses of secretin and pancreozymin in the perfusion system, similar results were obtained as in the incubation experiments. Apparently secretin affects insulin secretion of the islets via the normally surrounding exocrine pancreatic tissue.

4629 PANCREAS ACINAR CELL REGENERATION. IX. EFFECT OF ACTINOMYCIN D ON MICROSTRUCTURE. (E.) Yamaguchi, K. (State U. New York Downstate Med. Ctr., Brooklyn), Y. Kobayashi, T. Sato, L. Herman, W. H. Marsh, L. Rosenstock and P. J. Fitzgerald. *Am. J. Pathol.* 64(2): 337-356, 1971.

The effects of actinomycin D (AD) on the ultrastructure of normal and regenerating pancreas were studied in rats. The administration of AD (0.5 to 1.0 mg/g body weight s.c.) to normal rats produced zonal segregation in the nucleolus followed by cytoplasmic changes which resembled those produced by ethionine. When this drug (0.5 mg/g s.c.) was given on the first day after the administration of ethionine, it prevented regeneration of the exocrine pancreas. Regeneration was markedly decreased when AD was injected on day 12, however, little effect was seen following administration on either day 13 or 14. Following the injection of 0.05 mg/g body weight of AD there was a decrease in cytoplasmic basophilia, in ergastoplasm and free ribosomes suggesting an impairment of RNA syntheses. The effect of the higher doses of AD on regenerating rat pancreas on days 11 and 12 may be due to the prevention of DNA transcription and the formation of messenger RNA.

4630 PANCREAS ACINAR CELL REGENERATION. X. EFFECT OF ACTINOMYCIN D ON ENZYMATIC ACTIVITIES. (E.) Marsh, W. H. (State U. New York Coll. Med., Brooklyn) and P. J. Fitzgerald. *Am. J. Pathol.* 64(2):357-371, 1971.

The effects of actinomycin D (AD) on the enzyme activities in normal and regenerating rat pancreas were studied. One hour after drug injection (0.5 to 1.0 mg/g body weight s.c.) there was a decrease in the levels of amylase, lipase and chymotrypsin, followed by a rebound to normal levels and a subsequent return to low levels 1 to 2 days later. Injection of 0.05 mg/g of AD was followed by decreases in enzyme activities 1 to 3 days after injection. When 0.5 mg/g of this drug was administered in a single dose to rats after ethionine treatment (regenerating), enzyme activities were significantly reduced on day 5 of regeneration. While the injection of 0.5 mg/g of ACTD on multiple days during regeneration caused enzyme activity levels to be higher than those in controls, the injection of 0.05 mg/g was followed by a significant decrease in enzyme levels. This paradox may be due to a decrease in the synthesis of the repressor of the messenger RNA for the enzyme, making more messenger RNA available for enzyme synthesis.

4631 EFFECTS OF SECRETIN ON SERUM IMMUNOREACTIVE INSULIN AND INSULIN-LIKE ACTIVITY. (E.) Diaco, J. F. (c/o A. Matkowski, U. Pennsylvania Hosp., Philadelphia), L. D. Miller, P. T. Kuo, L. Y. Feng and H. J. Sugarman. *Ann. Surg.* 173(4):578-582, 1971.

In mongrel dogs who had their pancreatic venous drainage diverted into the inferior vena cava, evels of serum insulin-like activity were ctually higher in the portal circulation than n the venous drainage directly from the pancreas. here was a 2- to 4-fold increase in both insulin-ike activity and immunoreactive insulin levels ollowing the addition of secretin in vitro to ne serum of dogs having a glucose tolerance est. This increase was not observed after the ddition of pancreozymin, gastrin, glucagon or ypsin. Insulin-like activity was increased 2-old and immunoreactive insulin levels rose 10-old after 0.4 U of secretin was added to pre-ncreatectomized dog sera. However, secretin, dded to serum taken 24 hr after pancreatectomy, d no effect on insulin activity. There may be substance released by the pancreas which, in ombination with secretin, gives rise to an evation of both immunoreactive insulin and nsulin-like activity.

32 SULFATE METABOLISM IN PANCREATIC ACINAR CELLS.

(E.) Berg, N. B. (U. lifornia Sch. Med., Los Angeles) and R. W. ung. *J. Cell. Biol.* 50(2):469-483, 1971.

male C57BL/6J mice were injected via the ternal jugular vein with ^{35}S-sulfate and were crificed 10 min to 12 hr after injection. At min after injection, label was concentrated the Golgi complex, with nearly 50% of the silver grains situated over the small vesicles and agranular membranes of the Golgi complex, which accounted for only 6% of the area of the cell sections. Some of the condensing vacuoles associated with the Golgi complex were also labeled, containing about 6% of the total radioactivity. Scattered silver grains were present over the zymogen granules, nucleus, mitochondria and granular endoplasmic reticulum, but none of these organelles showed evidence of preferential labeling. During the following 20 min, labeling in the Golgi complex decreased by 50% and labeling of the condensing vacuoles increased to 35% of the total label, although they represented less than 2% of the area. During the next 30 min, there was a further decrease in labeling of the Golgi complex and a moderate decrease of that in the condensing vacuoles. At this time, although only some of the zymogen granules were labeled, they contained 35% of the label. At 4 hr after injection, only the zymogen granules contained significant amounts of label, with 70% of label being contained in 50% of the granules. By 8 hr, and increasingly at 12 hr, the continued secretion of labeled zymogen granule material depleted the acinar cells of most of the label; less than 20% of granules were labeled at 8 hr, less than 10% at 12 hr. Throughout the period, the concentration of label in the nucleus, mitochondria and granular endoplasmic reticulum was very low or negligible and remained unchanged.

HEPATOBILIARY TRACT

33 STUDIES ON THE MECHANISM OF TRYPTOPHAN INDUCTION OF CERTAIN HEPATIC ENZYMES.

.) Kido, R. (Wakayama Med. Coll., Japan), M. shino and H. Tsuda. *Am. J. Clin. Nutr.* 24(7): 6-769, 1971.

e effect of tryptophan and cinnabarinic acid ministration on the induction of various liver zymes was studied in intact and adrenalectomized ts. Both tryptophan and cinnabarinic acid re consistently followed by increases in liver reonine dehydrase, ornithine transaminase and rosine transaminase, in both intact and adrenal-tomized rats; however, threonine dehydrase was duced to a greater extent by cinnabarinic acid. llowing the administration of either compound, reonine dehydrase activity gradually increased, ached a peak at 12 hr, and thereafter declined. osphoenolpyruvate carboxykinase activity was evated in intact and adrenalectomized animals response to tryptophan administration.

4634 AN IN VIVO COMPARISON OF TWO BILE SALT BINDING AGENTS, CHOLESTYRAMINE AND LIGNIN.

(E.) Heaton, K. W. (Bristol Roy. Infirm., England), S. T. Heaton and R. E. Barry. *Scand. J. Gastroenterol.* 6(3):281-286, 1971.

Subjects consisted of 4 healthy volunteers who took either lignin (10 g/day p.o.) or cholestyramine (12-16 g/day p.o.) for 2-3 weeks before studies were made of the turnover and metabolism of taurocholate during the 5-day period after i.v. injection of sodium taurocholate-24-^{14}C. In both subjects who took cholestyramine, the half-life of taurocholate was markedly decreased and this was greatest in the one taking the larger dose. There was no appreciable effect on the half-life of taurocholate in both subjects receiving lignin. In both subjects on cholestyramine, the half-time for the disappearance of total biliary radioactivity was greatly reduced, and this reduction was greater than that seen with the half-life of taurocholate. Lignin had such effect at 6 g/day, while at 10 g/day the total biliary radioactivity half-time was 28% shorter than the control value. In the fifth day bile sample, there was no change in distribution with either bile-acid binding agent. Cholestyramine markedly altered the composition of the bile salt pool causing a 250% increase in the ratio of glycine/taurine conjugates and a 160% increase in the ratio of trihydroxy/dihydroxy bile salts at 12 g/day, with increases of 400% and 200%, resp., at 16 g/day. With lignin there was no significant effect on the conjugates, while the other ratio was increased by 140% in 2 and unchanged in a third subject.

4635 THE ROLE OF MICROSOMES IN THE HEPATIC METABOLISM OF ETHANOL. (E.) Carter, E. A. (Harvard Med. Sch., Boston, Mass.) and K. J. Isselbacher. *Ann. NY Acad. Sci.* 179:282-294, 1971.

In the absence of ethanol or oxygen or NADPH, little activity of the microsomal ethanol oxidizing system was observed in rats. Cyanide and potassium cholate (NADPH oxidase inhibitor) produced the greatest degree of partial inhibition, while $AgCl_2$ and $CuCl_2$ (inhibitors of ADH, catalase, and NADPH oxidase) abolished microsomal ethanol oxidizing system activity. The addition of ADH, catalase, or both led to marked stimulation of ethanol oxidizing activity even though their respective cofactors were not added. This stimulation could be reduced by inhibiting NADPH oxidase with potassium cholate. The stimulation of the NADPH oxidase in vitro by iron plus ADP or in vivo with chronic alcohol feeding also was associated with an increased microsomal ethanol oxidizing system activity. On the other hand, phenobarbital pretreatment, which stimulates the NADPH cytochrome C reductase but not NADPH oxidase, does not stimulate microsomal activity. The microsomal ethanol oxidizing system activity is apparently not the result of a distinct enzyme but rather of an NADPH oxidase working in concert with ADH and/or catalase present in the microsomal fraction.

4636 THYMUS-INFLUENCED IMMUNOLOGICAL MATURATION OF EMBRYONIC LIVER CELLS. (E.) Umiel, T. (U. Wisconsin Dept. Zool., Madison). *Transplantation* 11(6):531-535, 1971.

Embryonic mice (14-17 days) used as liver donors were either of the C57BL/6JAu strain or from the F_1 hybrid of BALB/cAu X C57BL/6JAu. Neonatally (within 24 hr of birth) thymectomized F_1 (BALB/c X C57BL) mice were injected with 5 X10^7 isogeneic (F_1) or parental embryonic (C57BL) liver cells. While none of the spleens of F_1 mice which were injected with isogeneic liver cell showed any positive spleen index (greater than 1.3), 5 of 9 thymectomized animals injected with parental liver cells showed a response, and the spleen index in these mice was as high as that of control nonthymectomized mice injected with parental liver cells. Adult F_1 (BALB/c X C57BL) mice were thymectomized at 3-4 months of age and then maintained for a further 3-4 months without treatment. At the end of this period they received 700 R whole body irradiation and were injected on the following day with either parental (C57BL) or F_1 liver cells obtained from 15-17-day-old embryos. The spleens of the hosts, now presumed to carry donor liver cells, were removed at 2-30 days and their ability to elicit a graft-versus-host reaction in vitro was tested. Spleens of mice treated with C57BL liver cells removed up to day 20 were unable to induce this reaction, while after day 20, about 50% of the neonatal explants treated with parentally-derived liver cells showed the splenomegalic response characteristic of this response. When this experiment was performed with intact, nonthymectomized irradiated mice, a reaction was seen when spleens were removed after 6 days. Histological examination confirmed both in vivo and in vitro observation of the graft-versus-host reaction.

4637 A TECHNIQUE FOR THE COLLECTION OF BILE FROM UNANAESTHETIZED RATS AND INFLUENCE OF ANAESTHESIA ON CHOLERESIS AND CHOLERETIC-INDUCED CHOLERESIS. (E.) Meli, A. (A. Menarini Res. Dept., Florence, Italy) and M. Riva. *Farmaco Prat.* 26(5):269-274, 1971.

Male rats were fasted overnight and the bile duct was cannulated under ether or urethane (160 mg/100 g, s.c.) anesthesia. The polyethylene tubing was inserted into the common bile duct and later passed through the s.c. tissue and exteriorized dorsally to the root of the tail which had been amputated a few weeks earlier. After cannulation, 30-40 min were required to establish constant bile flow and this was then measured for 2 hr before administration of choleretic agents. Bile flow in untreated unanesthetized rats was significantly greater than that in anesthetized rats, but bile concentration was not affected. In unanesthetized animals, there was a significant increase in bile flow after p.o. administration (at 100 mg/kg) of 1-phenylpropanol, 1-phenylpentanol, cyclohexanon-2-benzyl-2-propionic acid, and α-hydroxycyclohexyl butyric acid, but not after dehydrocholic acid. All but dehydrocholic acid and cyclohexanon-2-benzyl-2-propionic acid also caused a significant decrease in bile concentration. With the possible exception of animals treated with cyclohexanon-2-benzyl-2-propionic acid, compared with control values, the rate of chloretic-induced bile flow was significantly greater in unanesthetized than in anesthetized animals. Compared with unanesthetized animals, anesthetized rats had significantly greater concentrations of bile after treatment with 1-phenylpropanol or α-hydroxycyclohexyl butyric acid, while the opposite was seen in rats treated with dehydrocholic acid.

4638 BILE ACID SYNTHESIS IN THE ISOLATED, PERFUSED RABBIT LIVER. (E.) Mosbach, E. H. (Public Health Res. Inst., New York, N. Y.), M. A. Rothschild, I. Bekersky, M. Oratz and J. Mongelli. *J. Clin. Invest.* 50(8):1720-1730, 1971.

Acetate-1-^{14}C, mevalonate-2-^{14}C, cholesterol-4-^{14}C, and 7α-hydroxycholesterol-4-^{14}C were used as precursors to determine the rate-limiting step in bile acid synthesis in perfused rabbit livers. Analysis of bile after perfusion revealed 7.4 mg of glycodeoxycholate, 0.34 mg of glycocholate, and 0.06 mg of cholesterol. The bile of rabbits treated with cholestyramine contained 3.7 mg of glycodeoxycholate, 3.3 mg of glycocholate, and 0.05 mg of cholesterol. Cholestyramine caused a 5-20 fold increase in the incorporation of acetate-^{14}C, mevalonolactone-^{14}C, and cholesterol-^{14}C into cholate in the livers of treated animals. The incorporation of 7α-hydroxycholesterol-^{14}C into cholate was unaffected by dietary pretreatment. Cholestyramine treatment seems to interrupt the enterohepatic circulation of bile acids and release the feedback inhibition of the rate-controlling enzyme of bile acid synthesis. Thus, the 7α-hydroxylation of cholesterol appears to be the rate limiting step in bile acid formation.

4639 CHOLESTEROL METABOLISM AND VITAMIN B_6. III. THE STIMULATION OF HEPATIC CHOLESTEROGENESIS IN THE VITAMIN B_6-DEFICIENT RAT. (E.) Hinse, C. M. (Laval U. Med. Sch., Quebec, Canada) and P. J. Lupien. *Can. J. Biochem.* 49(8):933-935, 1971.

The rate of hepatic cholesterogenesis in pyridoxine-deficient rats was studied in vitro using liver slices taken from animals after 8 weeks on specific diets. In liver slices from pyridoxine-deficient rats the rate of incorporation of acetate-^{14}C nto cholesterol was 3 times higher than the control group and 5.5 times higher than that in the pair-fed group (semisynthetic diet). The difference between results for deficient and pair-fed animals.was greater when homogenates were used than when slices were used. The slices were approximately 15 times more efficient than the homogenates in incorporating the labeled acetate into cholesterol. A 33% lower activity of the Krebs cycle was observed in the pair-fed roup relative to the controls. The hepatic acetate pool size was decreased by about 30% in pyridoxine-deficient rats and increased by about 0% in the pair-fed group.

640 MECHANISM OF HEPATIC DRUG OXIDATION AND ITS RELATIONSHIP TO INDIVIDUAL IFFERENCES IN RATES OF OXIDATION IN MAN. (E.) avies, D. S. (Roy. Postgrad. Med. Sch., London) nd S. S. Thorgeirsson. *Ann. NY Acad. Sci.* 79:411-420, 1971.

he plasma half-life of antipyrine and phenyl-utazone were measured in 8 normal subjects following the administration of 10 mg/kg p.o. and 5 mg/kg p.o. resp., in single doses and in 5 daily doses. The half lives for antipyrine ranged from 6 to 22 hr independent of the dose regimen, the repeatability in the same subjects being good. The half-life of phenylbutazone ranged from 47 to 142 hr, however, in 4 subjects the half-life following a single dose was considerable longer than the multiple dose half life. Antipyrine half-lives plotted against multiple-dose phenylbutazone half-lives in the same subjects showed excellent correlation, but this was not true when they were plotted against single-dose phenylbutazone half-lives. Antipyrine half-lives measured after 5 days of dosing with phenylbutazone were slightly longer than half-lives for this drug before dosing with phenylbutazone. Fresh samples of human liver showed microsomal protein concentrations ranging from 9.5 to 14.9 mg/g of wet liver (lower than 18 mg found in adult male rats) and cytochrome P-450 concentrations ranging from 0.68 to 1.02 mμ moles/mg of microsomal protein (similar to that of rats). A 4-fold range of activities were found for ethylmorphine N-demethylase in 6 subjects studied, and a good correlation between in vitro rates of oxidation and antipyrine plasma half-lives was observed.

4641 BILIRUBIN: A MODEL FOR STUDIES OF DRUG METABOLISM IN MAN. (E.) Reyes, H. (Albert Einstein Coll. Med., New York, N. Y.), A. J. Levi, R. Levine, Z. Gatmaitan and I. M. Arias. *Ann. NY Acad. Sci.* 179:520-528, 1971.

The mechanism of hepatic uptake of bilirubin was studied in rats to demonstrate the usefulness of bilirubin as a model for studies of drug metabolism in man. Five min after the i.v. injection of radio-labeled unconjugated bilirubin (UCB) in normal and uridine diphosphate glucuronic acid transferase deficient Gunn rats, 40-50% of the injected dose was recovered in the liver. Five min after i.v. injection of radiolabeled UCB, 65% of intrahepatic bilirubin was localized in the cytoplasm. Three min after the i.v. injection of BSP in vivo, Y and Z protein fractions from 100,000 x g rat liver supernate contained 75% of the dye. These 2 basic proteins seem to account for most of the organic anion bound by each fraction. A review of the evidence that supports the hypothesis that Y and Z are major determinants of the selective uptake process by which the liver cell transfers organic anions from plasma is presented.

4642 CHANGES IN BILE SECRETION UNDER VARIOUS HEMODYNAMIC CONDITIONS. (Ger.) Blümel, G. (Univ. 1st Surg. Clin., Vienna, Austria), L. Peschl and A. Neumayr. *Z. Gastroenterol.* 9(1):2-10, 1971.

Clamping off the hepatic artery had no effect on bile flow in 9 dogs while clamping off the portal vein cqused an abrupt decrease in bile flow and systemic arterial pressure but had no effect on liver response to dehydrocholic acid (5 ml i.v.). The decrease in bile secretion was not due to a decrease in plasma volume since administration of 500 ml of polyvinylpyrrolidone caused no change in spontaneous bile flow. After a side-to-side portocaval shunt had been made, only a small temporary decrease in bile flow occurred, even when the trunk of the portal vein was clamped off. Shock produced by loss of 50% of the blood volume caused a significant decrease in bile flow, but response to dehydrocholic acid persisted for 130 min despite low blood pressure. When the animals breathed oxygen-deficient air for 40 min, no change occurred in bile flow. Bile flow decreased in both normal and hypoxic animals after the portal vein was clamped off, but injection of dehydrocholic acid rapidly increased bile flow in both groups of animals. These findings suggest that normal bile flow and normal response to a choleretic agent do not depend on either arterial or venous blood supply in the liver, but on an adequate oxygen supply to bile-producing liver cells. However, arterial blood pressure may play a secondary role in secretion of bile constituents in the bile ductules.

4643 EFFECT OF NICKEL CARBONYL UPON HEPATIC CONCENTRATIONS OF ADENOSINE TRIPHOSPHATE.

(E.) Sunderman, F. W., Jr. (U. Connecticut Sch. Med., Newington). *Res. Commun. Chem. Pathol. Pharmacol.* 2(4-5):545-551, 1971.

The effect of nickel carbonyl, Ni(Co)4, on hepatic ATP concentrations was studied in rats to determine if the inhibitory effect of Ni(Co)$_4$ on RNA synthesis results from depletion of hepatic ATP. Phenobarbital administration (10 mg/100 g i.p.) at 24 and 48 hr before sacrifice had no effect on the mean concentration of hepatic ATP. Injection of Ni(Co)4 (2.2 mg/100 g i.v.) at 30 min or 24 hr before sacrifice caused average increases of +12% and +13%, resp., in hepatic ATP concentrations when compared with controls. Rats killed on days 2 to 7 after injection showed hepatic ATP concentrations similar to those in control groups. The observed increase in hepatic ATP levels may be mediated by Ni^{2+} inhibition of hepatic ATPase activity.

4644 ABSENCE OF ANDROGEN STIMULATION OF HEPATIC STEROID SULFATASE IN THE FEMALE RAT.

(E.) Schneider, G. (Yale U. Dept. Med., New Haven, Conn.), A. French, L. P. Bullock and C. W. Bardin. *Endocrinology* 89(1):308-310, 1971.

The effect of testosterone treatment on hepatic steroid sulfatase levels was studied in male and female rats. Female rats had 50% less enzyme than males. Orchidectomy was followed by a decrease of 40% in steroid sulfatase activity; however, treatment with dihydroxytestoterone (DHT) maintained enzyme activity at about 80% of normal. Following the administration of testosterone to intact female rats, there was a 25% decrease in enzyme activity. A 25% decrease in enzyme activity was observed 4 weeks after ovariectomy, and testosterone treatment produced no additional decline in hepatic steroid sulfatase activity. Thus, androgens may exert an indirect action on this hepatic enzyme by suppression of ovarian function.

4645 PLASMA METABOLITES AND BODY DISTRIBUTION OF RADIOACTIVITY IN NORMAL AND CIRRHOTIC RATS AFTER INTRAPORTAL INJECTION OF ^{14}C-5HT.

(E.) Pentikäinen, P. (U. Helsinki Dept. Pharmacol., Finland), M. Kekki and O. Mustala. *Life Sci.* 10, Pt. 1(9):519-528, 1971.

Male Sprague-Dawley rats with diet-induced experimental cirrhosis were anesthetized and then administered a single portal vein injection of 5-hydroxytryptamine-3'-^{14}C creatinine sulfate. In noncirrhotic control rats, the highest concentrations of label were found, in decreasing order, in the intestine, liver, kidney and spleen, with the liver containing 26% of injected label. Compared with controls, cirrhotic rats showed significantly lower levels of label in the intestine, liver and spleen and significantly greater levels in whole blood, plasma, muscle and kidney. In cirrhotic rats, the total content of label, as a % of dose, was significantly lower than controls for liver and significantly higher for kidney, heart and brain. The total body pool of serotonin metabolites contained significantly more metabolites of the labeled serotonin in cirrhotic rats than in controls. In platelet-poor plasma from cirrhotic rats, there was a significant increase in all the glucuronide conjugates, while the opposite was true for the unmetabolized labeled 5-hydroxytryptamine and the sulfate conjugates of 5-hydroxyindoleacetaldehyde and 5-hydroxyindoleacetic acid. Plasma and urinary metabolite patterns were quite similar.

4646 CONTROLLED STUDY OF AUTOIMMUNIZATION AGAINST LIVER IN INBRED RAT STRAINS.

(E.) Maclaurin, B. P. (U. Otago Med. Sch., Dunedin, New Zealand). *Gut* 12(6):458-464, 1971.

The effect of repeated injections of homologous liver homogenate in complete Freund's adjuvant into inbred rats was studied histologically and quantitatively and an assessment of delayed skin hypersensitivity to the liver antigen was made. A low grade autoimmune "cholangitis" with periductular fibrosis and an increase in the number of lymphocytes in the portal tracts and infiltratin the walls of involved bile ducts were observed. Serial spleen cell injections successfully transferred the liver lesions to isogenic animals. Pulmonary lymphocytic infiltration correlated with direct liver immunization and with transfer of whole immunized cells, however there was no

orrelation with transfer of sonicated cells or
ith injection of adjuvant alone. A mild but
ariable delayed skin hypersensitivity was
bserved in response to the intradermal injection
f supernatant of the liver homogenate. A com-
ined cellular and antibody-mediated immune
esponse directed against bile duct constituents
ay account for this reaction.

647 Cl INHIBITOR: EVIDENCE FOR DECREASED
HEPATIC SYNTHESIS IN HEREDITARY
NGIONEUROTIC EDEMA. (E.) Johnson, A. M. (U.
orth Carolina Sch. Med., Chapel Hill), C. A.
lper, F. S. Rosen and J. M. Craig. *Science*
73(3996):553-554, 1971.

luorescein-labeled antibody was used to localize
he inhibitor of the first component of complement
Cl) in normal liver and in liver of 2 patients
ith hereditary angioneurotic edema and low serum
oncentrations of Cl inhibitor. Specific
luorescence of Cl inhibitor was seen in the
ytoplasm of 5-10% of parenchymal cells in
ections of liver from 3 normal subjects, however,
o liver cells from the deficient patients con-
ained detectable Cl inhibitor fluorescence.
hen the patients' livers were reacted with anti-
era to transferrin and C4, specific cytoplasmic
luorescence was demonstrable in parenchymal cells.
he absence of specific Cl inhibitor fluorescence
n Kupffer cells or connective tissue suggests
hat the hepatic parenchymal cells, rather than
he reticuloendothelial system of fibroblasts,
re probably the primary site of synthesis of
his protein.

648 FETAL BILE SALT METABOLISM. I. THE
METABOLISM OF SODIUM CHOLATE-^{14}C IN
HE FETAL DOG. (E.) Jackson, B. T. (Boston U.
ch. Med., Mass.), R. A. Smallwood, G. J. Piasecki,
. S. Brown, H. F. J. Rauschecker and R. Lester.
. *Clin. Invest.* 50(6):1286-1294, 1971.

n utero administration of tracer amounts of ^{14}C-
odium cholate was used to study the metabolism
f cholate in fetal dogs 1 week before birth.
njected label was cleared rapidly from the fetal
lasma mainly by the fetal liver and, to a far
esser extent, by placental transfer to the
other. Cholate was conjugated with taurine in
he fetal liver and this conjugate was then
xcreted into the proximal small intestine. The
etal liver was shown to be almost as efficient
s the adult liver in terms of uptake, conjugation
nd excretion of ^{14}C-cholate. The slightly
ecreased maximum rate of excretion of label and
he slightly decreased proportion of the total
ose excreted in 10 hr in the fetal liver was
scribed to placental transfer of about 2.8% of
he injected dose of label in the fetus. There
as no difference in the rates of fetal excretion
f labeled cholate and taurocholate.

4649 IMPAIRMENT OF GLUCOSE HOMEOSTASIS AFTER HEPATIC ISCHEMIA. (E.) Lampe, E. W., II (U. Minnesota Health Sci. Ctr., Minneapolis), A. W. Moberg, R. L. Simmons and J. S. Najarian. *J. Surg. Res.* 11(5):224-231, 1971.

Blood glucose levels were studied in 5 patients undergoing orthotopic hepatic transplantation and in 55 dogs subjected to experimental hepatic ischemia. After 40 min of hepatic ischemia, glucose levels fell to 30% or more below control values within 15 min, and remained there for at least 3 hr. When glucose loading followed ischemia, hyperglycemia persisted for several hr. The extent of mean change in glucose level increased with the duration of normothermic ischemia. Under conditions of hypothermic asanguinous hepatic perfusion, the degree of glucose intolerance was comparable to that found for a similar period (20 or 40 min) of normothermic stagnant ischemia. Under conditions of glucose infusion with no hepatic ischemia, hepatic venous glucose levels were lower than either the portal venous or arterial blood glucose levels during glucose infusion in 5 normal dogs. After 60 min of hepatic ischemia, the glucose uptake during hyperglycemia was reduced compared with controls. Normal dogs demonstrated a prompt rise in blood glucose after administration of glucagon, while in others, after 60 min. of ischemia, the response to glucagon was depressed and hepatic glucose output was slow to increase. In terms of response to exogenous insulin, no difference was found in the rate of change of decrease on glucose levels between normal dogs and dogs after 60 min of hepatic ischemia; there was also no significant difference between the 2 groups with respect to effect of endogenous insulin. It was concluded that none of the observed changes in glucose uptake could be attributed to a persistent ischemia or impeded drainage of blood from the liver.

4650 CATABOLISM OF MUCOPOLYSACCHARIDE PROTEINS IN THE RAT LIVER AFTER ADMINISTRATION OF ETHANOL. (Ger.) Platt, D. (Justus Liebig U. Giessen Med. Clin., Germany), U. Stein and H. Heissmeyer. *Z. Klin. Chem. Klin. Biochem.* 9(2):126-129, 1971.

Measurement of lysosomal enzyme activities in the livers of 20 male Wistar rats after injection of ethanol (1 g/day i.p. for 14 days) showed that different changes occurred in the activities of glycosamino-glycanohydrolases and peptidyl-peptide hydrolases which take part in breaking down the mucopolysaccharide-protein complex. In the lysosome fraction the activities of β-glucuronidase, β-acetylglucosaminidase, and acid carboxypeptidase decreased significantly. In the supernatant of the lysosome fraction hyaluronidase and β-glucuronidase activities decreased significantly. The protein concentration decreased significantly in the lysosome fraction but remained constant in the supernatant.

4651 ON THE SIMILARITY BETWEEN THE HEMOLYTIC PROPERTIES OF BILE ACIDS AND OF NEUTRAL STEROIDS. (E.) Segal, R. (Hebrew U. Sch. Pharm., Jerusalem, Israel) and I. Milo-Goldzweig. *Life Sci.* [*II*] 10(12):685-690, 1971.

Results are reported on the relative abilities of bile acids (in solution with dimethyl sulfoxide) to hemolyze erythrocytes during 2-hr incubation at 37°C. Compounds tested included: 5β-cholanic acid and its methyl ester; lithocholic acid (3α-hydroxy-5β-cholanic acid) and 3β-hydroxy-5α-cholanic acid and their acetate, methyl ester and acetate methyl esters; desoxycholic acid (3α, 12α-dihydroxy-5β-cholanic acid) and its diacetate, methyl and diacetate methyl esters; hyodesoxycholic acid (3α, 6α-dihydroxy-5β-cholanic acid) and chenodesoxycholic acid (3α,7α-dihydroxy-5β-cholanic acid) and their diacetate, methyl and diacetate methyl esters. In terms of decreasing hemolytic activity, 5β-cholanic acid was greater than lithocholic acid which was greater than desoxycholic acid, hyodesoxycholic acid and chenodesoxycholic acid. Lithocholic acid methyl ester was more active than the equally active methyl esters of desoxycholic acid, hyodesoxycholic acid and chenodesoxycholic acid. The inhibitory effect of the hydroxy radical on hemolysis was independent of the location of this group on the sterol ring. Hemolysis was greatly increased by the presence of the acetate moiety on the sterol ring. In the trifunctional desoxycholic acids, the tri-esters had similar hemolytic potencies as the di- and monoesters. In terms of the stereochemistry at positions 3 and 5, there was slightly greater hemolytic activity with lithocholic acid than with its steric isomer, 3β-hydroxy-5α-cholanic acid.

4652 ORNITHINE DECARBOXYLASE: A DEFECT IN LIVER REGENERATION FOLLOWING PORTACAVAL SHUNT. (E.) Fischer, J. E. (Massachusetts Gen. Hosp., Boston), A. Myers and H. James. *Surgery* 70(2):182-188, 1971.

End-to-side or side-to-side portacaval shunts were constructed in mature Sprague-Dawley rats, which were later subjected to a standard 68% hepatectomy with excision of the median and left lateral lobes. When rats were sacrificed, the activity of ornithine decarboxylase was assayed in the remaining caudate and right lateral lobes. In rats with end-to-side shunts, after hepatectomy the activation of ornithine decarboxylase was not seen as it was in unshunted and side-to-side shunted rats after partial hepatectomy. In rats receiving injections of 40% CCl_4 there was no inhibition of activation of this enzyme after partial hepatectomy. When enzyme activity in residual liver was measured 4 hr after i.p. injection of 25 mg/kg of growth hormone, there was almost as great a degree of activation of enzyme activity in end-to-side shunted rats as in sham-operated controls. It was concluded that end-to-side portacaval shunted rats have a marked defect in hepatic synthesis of polyamines.

4653 INFLUENCE OF HIGH CHOLESTEROL DIET ON SOME LIVER ENZYMES. (E.) Sapre, N. (Univ. Dept. Biochem., Nagpur, India) and C. H. Chakrabarti. *Enzymologia* 40(1):64-70, 1971.

4654 ALCOHOL AND ITS METABOLISM IN THE LIVER. (Fl.) De Vos, M. (Acad. Hosp., Gent, Belgium). *Tijdschr. Gastroenterol.* 13(6): 467-475, 1971.

4655 DISTRIBUTION OF ALBUMIN IN HUMAN LIVERS. (Cz.) Brozman, M. (Charles U. Sch. Med., Bratislava, Czechoslovakia). *Cesk. Patol.* 6(4):174-180, 1970.

4656 NEW METHOD FOR MEASURING THE CHARGE OF TRANSFER RIBONUCLEIC ACID. A STUDY OF TRNA: AMINOACYL TRANSFER RNA RATIO DURING LIVER REGENERATION AFTER HEPATECTOMY. (Sp.) Hernandez Perez, O. (IMSS Natl. Med. Ctr., Mexico City, Mexico), A. Reyes Fuentes, A. Bernal Torres and A. Rosado Garcia. *Arch. Invest. Med.* 1(2):133-148, 1970.

4657 THE EXCRETION OF URINARY AND BILIARY BILIRUBIN AFTER INTRAVENOUS INJECTION OF NONCONJUGATED BILIRUBIN IN THE DOG. (Fr.) Barac, G. (U. Liege Lab. Physiopathol. Gen. Ther., France). *C. R. Soc. Biol. (Paris)* 164(4):916-921, 1970.

4658 ENIGMA OF BILIRUBIN CONJUGATION. (E.) Billing, B. H. (Roy. Free Hosp., London) and F. H. Jansen. *Gastroenterology* 61(2):258-260, 1971.

4659 EFFECT OF LIVER DAMAGE CAUSED BY CARBON TETRACHLORIDE ON THE SECRETION OF BILE SALTS AND LIPIDS INTO BILE OF SHEEP. (E.) Caple, I. W. (U. New South Wales Sch. Physiol., Kensington, Australia) and T. J. Heath. *J. Comp. Pathol.* 81(3):411-419, 1971.

4660 EFFECT OF ADRENALIN ON THE CARBOHYDRATE AND LIPID METABOLISM IN THE LIVER OF HEALTHY CHILDREN. (Cz.) Vítek, B. (Purkyne U. Med. Sch., Brno, Czechoslovakia), O. Teyschel, J. Snopková, S. Valničková and J. Vognárek. *Cesk. Gastroenterol. Vyz.* 25(5):199-203, 1971.

4661 INVESTIGATION OF LIVER FUNCTION DURING TREATMENT WITH ORAL CONTRACEPTIVES.

Sp.) Lienhard, C. P. (U. Buenos Aires Sch. Med., rgentina), L. R. Bosch and J. F. Aufiero. *bstet. Ginecol. Lat. Am.* 28(11-12):471-475, 1970.

662 METABOLISM OF ADULT RAT LIVER CELLS IN FILTER WELL CULTURE. (E.) Dickson, . A. (U. Wisconsin Med. Sch. McArdle Lab. Cancer es., Madison). *Exp. Cell Res.* 64(1):17-28, 1971.

663 BEHAVIOUR OF LIPOPEROXIDATION IN RAT LIVER DURING OROTIC ACID TREATMENT. E.) Torrielli, M. V. (U. Turin Inst. Gen. athol., Italy), M. U. Dianzani and G. Ugazio. *ife Sci.* [*II*] 10(2):99-111, 1971.

664 THE INFLUENCE OF EXOGENOUS CHOLESTEROL ON THE FATTY ACID COMPOSITION OF LIVER IPIDS IN THE RATS GIVEN LINOLEATE AND G INOLENATE. (E.) Takayasu, K. (U. Osaka Sch. ed., Japan) and I. Yoshikawa. *Lipids* 6(1):47-53, 971.

665 STUDIES ON THE METABOLISM OF TESTOSTERONE AND D4 ANDROSTENEDIONE BY HUMAN LIVER TISSUE. (Ger.) Engelhardt, D. (Univ. 1st Med. Clin., Munich, Germany), J. Eisenburg, P. Unterburger and H. J. Karl. *Klin. Wochenschr.* 49(7):439-440, 1971.

4666 THE EFFECT OF AN ESTROGEN PROGESTERONE COMBINATION ON GROWTH AND METABOLISM OF LIVERS AND KIDNEYS IN YOUNG FEMALE RATS. (Ger.) Mitznegg, P. (U. Erlangen/Nuremberg Pharmacol. Inst., Germany), W. Schwarzlose and C. J. Estler. *Klin. Wochenschr.* 49(10):615-617, 1971.

4667 BILE SECRETION INTO A VERTICAL TUBE. MAXIMAL BILE SECRETION PRESSURE AND INSTANT BILE FLOW IN NORMOTHERMIC AND HYPOTHERMIC RATS. (Fr.) Vanlerenberghe, J. (Sch. Med., Lille, France), R. Guislain and M. Delabre. *Rev. Med. Chir. Mal. Foie* 46(1):25-32, 1971.

4668 ON THE CONVERSION OF CHOLESTANOL INTO ALLOCHOLIC ACID IN RAT LIVER. (E.) Bjorkhem, I. (Karolinska Inst., Stockholm) and J. Gustafsson. *Eur. J. Biochem.* 18(2):207-213, 1971.

See also numbers: 4509, 4545, 4604, 4621, 4623

INTESTINE

669 RAT ENTEROKINASE: THE EFFECT OF IONS AND THE LOCALIZATION IN THE INTESTINE. E.) Nordström, C. (U. Lund Chem. Ctr., Sweden) nd A. Dahlqvist. *Biochim. Biophys. Acta* 242(1): 09-225, 1971.

he effects of divalent ions, ionic strength and I on rat enterokinase activity were studied to etermine the optimal ionic conditions for the ssay of enterokinase activity which was used to ocalize this enzyme in the rat intestine. Metal ons had no activating effect on rat enterokinase ctivity, however, the enzyme activity was rongly depressed by a rise in ionic strength the activation mixture. Significant enterokinase ctivity was present along the whole length of he small intestine except for the most distal art of the ileum, with maximal activity in the uodenum. Practically all the activity was ocalized in the villi with little activity in he crypts and none in the Brunner's glands. he subcellular localization of enterokinase was the brush border of the villous epithelial ells.

4670 EFFECT OF SOME DRUGS ON THE UPTAKE OF MONOAMINES AND THEIR PRECURSORS IN MOUSE PANETH CELLS. (E.) Ahonen, A. (U. Helsinki Dept. Anat., Finland) and A. Pentillä. *Acta Physiol. Scand.* 82(1):59-69, 1971.

The effects of various drugs on the uptake of monoamines and their precursors by Paneth cells was studied in mice using the histochemical formaldehyde-induced flourescence method. Flourescence was visible in the cytoplasmic granules of Paneth cells 10 min after the i.v. administration of dopamine, L-DOPA, α-methyl-DOPA, noradrenaline, or adrenaline. The monoamine oxidase inhibitors nialamide and pargyline markedly intensified the flourescence of the Paneth cell granules. No flourescence was seen in the cytoplasm of Paneth cells 10 or 30 min after the administration of tyrosine, α-methyltyrosine, α-methylnoradrenaline, 5-hydroxytryptophan or 5-hydroxtryptamine. Imipramine and cocaine markedly inhibited the dopamine and L-DOPA uptake by Paneth cells, whereas reserpine, chlorpromazine, promazine, amphetamine, amitriptyline, nortriptyline and guanethidine had no effect. Amphetamine, amitriptyline and nortriptyline similarly inhibited monoamine uptake after nialamide pretreatment.

4671 HISTOCHEMICAL AND AUTORADIOGRAPHIC STUDY OF THE EFFECT OF CHRONIC ADMINISTRATION OF CORTISONE ON DUODENAL MUCUS PRODUCTION IN THE DOG. (Fr.) Willems, G. (Free U. Brussels Exp. Surg. Lab., Belgium), A. Gérard and S. Verbeustel. *Arch. Fr. Mal. App. Dig.* 59(10-11, Suppl. 2)125-134, 1970.

In untreated dogs goblet cells in the duodenal mucosa synthesized sulfated mucoproteins containing sialic acid while the duodenal glands secreted neutral glycoproteins and, in smaller quantities, an analog of chondroitin-4-sulfate or chondroitin-6-sulfate. Administration of cortisone acetate (30 mg/kg/day i.m. for 16-18 days) increased secretion of the chondroitin sulfate analog by the duodenal glands but had no effect on goblet cell secretion. These findings conflict with previous reports that cortisone inhibits sulfation of polysaccharides in the gastrointestinal mucosa of rodents, but this discrepancy may be explained by species differences. It is also pointed out that cortisone, which has an ulcerogenic action, causes excessive production of a substance which is regarded as being protective; no cause-and-effect relation was established between these 2 actions since none of the cortisone-treated dogs developed an ulcer.

4672 STIMULATION OF INTESTINAL MUCOSAL ADENYL CYCLASE BY CHOLERA ENTEROTOXIN AND PROSTAGLANDINS. (E.) Kimberg, D. V. (Harvard Med. Sch., Boston, Mass.), M. Field, J. Johnson, A. Henderson and E. Gershon. *J. Clin. Invest.* 50(6):1218-1230, 1971.

Activity of adenyl cyclase was measured in membrane fractions prepared from duodenal, jejunal and ileal mucosa of the rat, rabbit and guinea pig. The highest level of enzyme activity was in the duodenum. With ileal preparations, adenyl cyclase activity was increased by the presence of the following prostaglandins in order of decreasing effectiveness: PGE_1, PGE_2, PGA_1, $PGF_{2\beta}$, PGB_1, $PGF_{1\beta}$, $PGF_{2\alpha}$, and $PGF_{1\alpha}$. The ileal short circuit current was also increased by the presence of prostaglandins, again with PGE_1 and PGE_2 having the most marked effects, but this was reversible by the addition of theophylline. Enzyme activity in guinea pig and rabbit ileal mucosa was increased by cholera enterotoxin only when the latter was used for a 1-2.5 hr in vitro or a 2.5 hr in vivo incubation of the mucosa, but not when it was added directly to the assay preparation. The effects of PGE, and NaF were similar in control and enterotoxin-treated mucosa. The rabbit ileal mucosa concentration of cyclic 3',5'-AMP was increased 3.5 times after in vitro incubation with cholera enterotoxin for 2 hr. The activity of adenyl cyclase was not influenced by epinephrine, insulin, glucagon, thyrocalcitonin, parathormone, thyroid-stimulating hormone or L-thyroxine.

4673 INTESTINAL CRYPT SURVIVAL AND TOTAL AND PER CRYPT LEVELS OF PROLIFERATIVE CELLULARITY FOLLOWING IRRADIATION: FRACTIONATED X-RAY EXPOSURES. (E.) Hagemann, R. F. (Allegheny Gen. Hosp., Pittsburgh, Pa.), C. P. Sigdestad and S. Lesher. *Radiat. Res.* 47(1): 149-158, 1971.

Adult male mice were exposured to 1000 or 600 R whole body irradiation followed by 400 or 800 R, resp., at varying times thereafter. Jejunal crypt survival increased rapidly for divided exposures separated by less than 4 hr, probably representing repair of sublethal damage (Elkind-type) by surviving crypt stem cells. Radioactivity increased markedly between 10 and 14 hr, at which time cells are progressing into the G_1 phase of the cell cycle. Total and per crypt levels of proliferative cellularity were measured 3 days after the second exposure. These curves represented the net result of perturbing a complex steady state in vivo system and presented a number of complexities which could not be reconciled. These included: large per crypt cell multiplicities along with fluctuations in cell cycle times, mitotic delay, and postirradiation alterations in the generation cycle. Another complexity was the compensatory response of this homeokinetically regulated tissue and the magnitude of this response in relation to the degree of initial damage.

4674 INTESTINAL CRYPT SURVIVAL AND TOTAL AND PER CRYPT LEVELS OF PROLIFERATIVE CELLULARITY FOLLOWING IRRADIATION: AGE RESPONSE AND ANIMAL LETHALITY. (E.) Hagemann, R. F. (Allegheny Gen. Hosp., Pittsburgh, Pa.) and S. Lesher. *Radiat. Res.* 47(1):159-167, 1971.

Mouse intestinal crypt survival and total and per crypt levels of proliferative cellularity were obtained following cell synchronization by hydroxyurea. The degree and temporal course of synchronization were concomitantly monitored by liquid scintillation spectrometry. Hydroxyurea killed more than 90% of S phase cells and blocked the G_1 to S phase transition for 2-3 hr. Two injections of this drug were used to obtain enhanced synchrony. There existed a marked degree of variation in the radioactivity of intestinal stem cells depending upon the age of the cell. Radiosensitivity decreases from G1 to G2 to S. Intraperitoneal injection of hydroxyurea immediately after irradiation reduced the LD_{50} from 1125 to 764 R. Total proliferative cellularity, 3 days after irradiation was directly related to crypt survival. Proliferative cellularity/surviving crypt was inversely related to crypt survival.

4675 MONOSACCHARIDE INHIBITION OF HUMAN INTESTINAL LACTASE. (E.) Alpers, D. H. (Washington U. Sch. Med., St. Louis, Mo.) and J. E. Gerber. *J. Lab. Clin. Med.* 78(2): 265-274, 1971.

Intestinal membrane-bound lactase was partially purified from human jejunal mucosa obtained at autopsy. Using a radioactive assay, glucose competitively inhibited partially purified lactase. Fructose and galactose were also competitive inhibitors of lactase activity, fructose being as effective as glucose. Lactase activity was not only inhibited by the 3 major dietary sugars but also by potassium gluconate and D-arabinose. The degree of inhibition was markedly dependent upon pH, the K_m for glucose rising with increasing pH. The addition of neither the substrate nor the inhibitor (which are not themselves ionized) changed the ionization constants of the enzyme complexes. Inhibition of lactase by sugars might be physiologically important and provide one mechanism for the production of lactose intolerance.

4676 IMMUNOLOGICAL STUDY OF PROTEINS AND SOME ISOENZYMES IN MUCOSAL CELLS OF THE SMALL INTESTINE. (Rus.) Kashkin, K. P. (Inst. Med. Radiol., Obninsk, USSR), A. N. Sharetskii, B. P. Surinov and D. N. Bochkova. *Biokhimiia* 36(2):335-342, 1971.

Ten protein fractions with different mobilities were isolated from the hyaloplasm of cells in the mucosa of the small intestine of fasting male August rats by means of agar-gel electrophoresis, and 24 enzyme fractions were separated on chromogenic substrates: 15 fractions which hydrolyzed carboxylic acid esters, 2 alkaline and 5 acid phosphatases, and 2 aspartate aminotransferases. On the basis of differences in their sensitivity to different inhibitors, the esterases were identified as 7 carboxylesterases and 8 acetylesterases. Immunoelectrophoresis with rabbit immune serum demonstrated that 25 to 26 antigens were present in hyaloplasm from small intestine mucosa: 4 serum antigens and 21 to 22 tissue antigens. The tissue antigens included organ- and tissue-specific antigens, enzymatic antigens, glycoproteins, lipoproteins, and thermostable, alcohol-insoluble VE-antigens. Some of these antigens were identical with antigens previously found in the spleen, liver, kidneys, testicles, brain, lymph nodes, spindle cell sarcomas, and RBC hydrolyzates of rats. Other antigens were not species-specific and have been found in hamsters and guinea pigs.

4677 OBSERVATIONS ON THE FORMATION OF ETHANOL IN THE INTESTINAL TRACT IN MAN. (E.) Blomstrand, R. (Karolinska Inst., Stockholm, Sweden). *Life Sci.* [*II*] 10(10):575-582, 1971.

Significant amounts of ethanol were found in the portal vein of a patient with liver malignancy and in the portal blood of rats unexposed to ethanol using gas chromatography-mass spectrometry. In the fasting state, the portal blood of this patient contained 6-8 times more ethanol than the cubital venous blood. The differences observed in the ethanol concentrations in the portal blood in the fasting state and after eating indicated a possible role for microbial fermentation in the intestinal tract in ethanol production. Conventional rats had a significantly higher concentration of ethanol in the portal blood than did germ free animals. Conventional rats had significantly more ethanol in the portal blood (0.085 mM) than in the aorta (0.001 mM).

4678 SOME PROPERTIES OF CHOLINESTERASES IN INTACT GUINEA-PIG ILEUM IN VITRO. (E.) Mittag, T. W. (New York Med. Coll., N. Y.), S. Ehrenpreis and P. Patrick. *Arch. Int. Pharmacodyn. Ther.* 191(2):270-278, 1971.

The diffusional barriers of drugs and substrates to the membrane-bound surface enzymes was studied in vitro on intact guinea-pig ileum using a radiometric assay. Acetylcholine (ACh), acetyl-β-methylcholine (MeCh) and butyrylcholine (BuCh) were all used as substrates, with BuCh and ACh being hydrolyzed with equal rapidity and MeCh-hydrolysis being about 75% slower. Stretching the tissue was followed by a 4-fold increase in BuCh and ACh hydrolysis. The K_m for ACh as determined on stretched tissues was 1.8×10^{-3} M. Rapid increase of temperature from 30° to 37°C produced an increase of 50 to 100% in the rate of ACh and MeCh hydrolysis within 10 min after changing the temperature. Recovery to the original rate of hydrolysis was more rapid for BuCh than for ACh when the temperature was lowered. The hydrolysis of ACh and BuCh by intact ileum was affected by at least 2 separate enzymes which could be distinguished by their differing susceptibility to inhibition by DFP. Butyrylcholinesterase was inhibited by DFB at a much faster rate than acetylcholinesterase.

4679 CHOLESTEROL SYNTHESIS BY THE GASTROINTESTINAL TRACT. (E.) Dietschy, J. M. (U. Texas Southwestern Med. Sch., Dallas) and H. J. Weis. *Am. J. Clin. Nutr.* 24(1):70-76, 1971.

4680 ASSAY OF PEPTIDASE ACTIVITIES OF INTESTINAL BRUSH BORDER MEMBRANE WITH L-AMINO ACID OXIDASE. (E.) Auricchio, S. (U. Naples Inst. Child Health, Italy), M. Pierro and M. Orsatti. *Anal. Biochem.* 39(1):15-23, 1971.

4681 N-ACETYL, β-GLUCOSAMINIDASE IN THE SMALL INTESTINE AND ITS CHANGES DURING POSTNATAL DEVELOPMENT OF THE RAT. (E.) Koldovsky, O. (Child. Hosp., Philadelphia, Pa.) and J. Herbst. *Biol. Neonate (Basel)* 17(1-2): 1-9, 1971.

4682 BACTERIAL FLORA OF THE SMALL INTESTINE IN SUBJECTS WITH SUBTOTAL GASTRIC RESECTION. (Ser.) Petrovic, M. (Vojna Hosp., Belgrade, Yugoslavia) and R. Jovanovic. *Vojnosanit. Pregl.* 28(1):7-10, 1971.

4683 ILEAL MICROFLORA IN SURGICAL PATIENTS. (E.) Nichols, R. L. (U. Illinois Coll. Med., Chicago), R. E. Condon, D. W. Bentley and S. L. Gorbach. *J. Urol.* 105(3):351-353, 1971.

4684 AGE DYNAMICS OF THE MITOTIC ACTIVITY OF LYMPHOEPITHELIAL FORMATION IN THE INTESTINE OF C57BL MICE. (Rus.) Romanenko, V. A. (Irkutsk Med. Inst., USSR). *Tsitologiia* 13(1):57-61, 1971.

4685 HORMONAL REGULATION OF DUODENAL SECRETION: EFFECTS OF GLUCAGON AND SECRETIN. (E.) Himal, H. S. (Roy. Victoria Hosp., Montreal, Quebec, Canada), F. Moqtaderi, A. E. Kark and J. Rudick. *Curr. Top. Surg. Res.* 3:453-463, 1971.

See also numbers: 4503, 4540, 4582, 4974

4686 A SIMPLE METHOD FOR LONG-TERM INTESTINAL AND INTRAVENOUS CANNULATION IN ANIMALS. (E.) Freeman, J. B. (Roy. Victoria Hosp., Montreal, Quebec, Canada), M. J. Wexler and L. D. MacLean. *J. Surg. Res.* 11(6):303-307, 1971.

A simple method for the construction and insertion of catheters for long-term venous sampling, intravenous feeding or intestinal intubation is described. Catheters for intestinal infusions and sampling could be left in place for periods of over 3 months. Erythema, infection, and leakage was not observed, possibly due to the nonreactivity of the Silastic used and the technique of fixation which prevented catheter movement. No catheters were pulled out by the animals. The technique which is described seems to be reliable and free of complications.

4687 EVALUATION OF THE INDICATOR DILUTION METHOD FOR THE MEASUREMENT OF TOTAL HEPATIC BLOOD FLOW IN DOGS. (Fr.) Huet, P. M. (St. Luc Hosp., Montreal, Quebec, Canada), G. Joubert, P. Lavoie and A. Viallet. *Un. Med. Can.* 100(4):673-679, 1971.

4688 ARTERIAL DISTRIBUTION IN THE VARIOUS PARTS OF THE LIVER IN TRIARTERIAL BLOOD SUPPLY PATTERNS. (Bul.) Kolikovski, N. *Khirurgiia (Sofiia)* 23(5):444-450, 1970.

See also number: 5148

4689 BLOOD GLUCOSE AND AMYLASE AFTER GLUCOSE LOADING IN DISEASES INVOLVING THE EXOCRINE PANCREAS. (Fr.) Le Quintrec, Y. (Bichat Hosp., Paris), M. Thomas and A. Lapègue. *Acta Gastroenterol. Belg.* 34(1):55-64, 1971.

Blood glucose and amylase were measured at various intervals 15-180 min after administration of glucose (0.70 g/kg p.o.) to 41 patients with confirmed or suspected diseases of the pancreas and to 34 controls. Test results were considered positive when amylase activities decreased by at least 15 Somogyi U, negative when amylase activities increased by 15 Somogyi U, and equivocal if amylase activities did not change by 15 Somogyi U or if a biphasic curve was obtained which did not parallel the blood glucose curve. Test results were positive in 15 of 24 patients with confirmed pancreatic disease, negative in 3, and equivocal in 6. Test results were positive in 3 of 6 patients with cancer of the pancreas and in 12 of 17 patients with calcifying pancreatitis. Normal results were obtained in 1 patient with calcifying pancreatitis, 1 patient with cancer of the pancreas, and 1 patient with a duodenal ulcer which perforated into the pancreas. Among patients with unconfirmed pancreatic disease, test results were positive in 8, negative in 1, and equivocal in 4. Among 4 patients with clinical symptoms suggestive of pancreatic disease which could not be confirmed at surgery, tests were positive in 3 and equivocal in 1.

4690 BLOOD GLUCOSE AND AMYLASE: THEIR VALUE IN THE DIAGNOSIS OF CHRONIC PANCREATITIS. (Fr.) Carboni, M. (U. Rome 2nd Surg. Clin.), N. Patrassi, M. Simi, E. Lezoche and C. Montesani. *Acta Gastroenterol. Belg.* 34(1):65-69, 1971.

Blood glucose and amylase were measured simultaneously every 30 min for 2 hr after administration of glucose (0.70 g/kg p.o.) to 83 patients with chronic pancreatitis confirmed at surgery and to 127 operated patients with no gross evidence of pancreatic disease. In patients with pancreatic insufficiency the amylase curve does not parallel the glucose curve. This test was positive in 80 of 83 patients with chronic pancreatitis and was negative in 3 patients who had almost complete obstruction of the pancreatic duct; in these patients it is necessary to determine enzyme activities in duodenal juice to confirm the diagnosis. False positive tests were obtained in 11 controls; these results may be caused either by functional pancreatic insufficiency or microscopic lesions of the pancreas.

4691 RAPID DETECTION OF AUSTRALIA/SH ANTIGEN AND ANTIBODY BY THE SIMPLE AND SENSITIVE TECHNIQUE OF IMMUNOELECTRONMICROSCOPY. (E.) Kelen, A. E. (Canadian Commun. Dis. Ctr., Ottawa, Ontario, Canada), A. E. Hathaway and D. A. McLeod. *Can. J. Microbiol.* 17(7):993-1000, 1971.

A relatively simple, rapid, and sensitive technique of immunoelectronmicroscopy (IEM) which can be used for detecting the Australia antigen and its corresponding antibody in serum specimens both qualitatively and quantitatively is presented. The method, which provides purified and concentrated preparations which are ready for EM examinations within an hour, was highly specific and yielded reproducible results. This test was more sensitive than the crossover electrophoresis test and almost as sensitive as the complement fixation test, however, this test was not affected by the prozone phenomenon. This described method is based on the EM visualization of characteristic aggregates of antigen-antibody complexes formed in the mixture of a serum specimen and a minute amount of the appropriate Australia/SH detector reagent.

4692 A LIVER-TRAPPING INDEX OF RADIOCOLLOID AS AN ESTIMATION OF PERFUSION. (E.) Rosenthall, L. (Montreal Gen. Hosp., Quebec, Canada), D. Greyson, Y. Lacourcière and A. Arzoumanian. *Radiology* 100(2):363-367, 1971.

The use of ^{99}m-technetium-sulfide colloid (TSC) liver uptake (to create a liver-trapping index) was compared to the blood ^{198}Au colloid retention as a parameter of hepatic perfusion in 130 consecutive patients. The range of liver trapping index (LTI) values in 97 normal patients was 2.9 to 5.2 and the mean spleen trapping index (STI) was 2.9. The 4.5 min ^{198}Au retentions ranged from 30 to 78%, 95% of the retentions being less than 70%. In 14 patients with cirrhosis the LTI range was 1.05 to 2.5 and STI values had a mean of 2.1. A range of 69-94% was recorded for the 4.5 min ^{198}Au retentions. Four patients with acute hepatitis and 4 with obstructive jaundice all had LTI values greater than 3 and 4.5 min ^{198}Au retentions of less than 70%. LTI values in 11 patients with malignant disease of the liver were low over the tumor and normal over uninvolved tissue. The LTI seems to yield a better separation of patients with impaired liver perfusion than ^{198}Au blood retention.

4693 A RAPID ONE-HOUR SPECTROPHOTOMETRIC CEPHALIN-CHOLESTEROL FLOCCULATION TEST. APPLICATION TO LIVER FUNCTION STUDIES. (E.) Ratliff, C. R. (Scott and White Clin., Temple, Tex.), P. E. Warren and A. E. Casey. *Am. J. Gastroenterol.* 55(6):589-593, 1971.

A rapid 1-hr spectrophotometric cephalin-cholesterol flocculation test for studying liver damage is described, and sera of 500 patients tested by the 4- and 1-hr procedures were compared. Variations from the nonsignificant range (0 to 2+) to the positive or significant range (3+ to 4+) occurred in only 3 sera. Only 0.2% of the sera tested varied by more than 2 flocculation units, and those results disagreeing by one flocculation unit were largely insignificant variations.

694 COBALT-ACTIVATED ACYLASE IN HUMAN SERUM. OCCURRENCE IN HEPATOBILIARY DISEASES. E.) Szewczuk, A. (Inst. Immunol. Exp. Ther., roclaw, Poland) and A. Szczeklik. *Clin. Chim. cta* 33(2):309-315, 1971.

he enzyme, strongly activated by Co^{+2} and nhibited by EDTA, was assayed colorimetrically gainst N-chloroacetyl-y-L-glutamyl-beta-aphthylamide in the sera of 60 healthy subjects nd 260 patients with various internal diseases. marked Co^{+2} activated acylase activity was resent in the sera of all (41) patients with iral hepatitis early in the icteric phase. nzymatic activity reached a peak in the first 2 eeks of jaundice; clinical improvement was ccompanied by a steady slow decrease of acylase ctivity. In 5 of 11 patients with acute and hronic cholangitis, acylase activity was present n the serum, but in levels lower than that seen n viral hepatitis patients. Acylase activity as absent or negligible in the sera of normal ubjects and patients with acute or chronic holecystitis (26), obstructive jaundice due to holedocholithiasis (12), liver cirrhosis (10) r cancer of the liver (416). The estimation of cylase activity might be useful in the differential iagnosis of jaundice.

695 ENDOSCOPIC EXAMINATION OF THE DUODENAL BULB: A COMPARISON WITH X-RAY. (E.) elber, J. P. (VA Hosp., Martinez, Calif.). *astroenterology* 61(1):55-61, 1971.

he current status of duodenoscopy as a means of iagnosing proximal duodenal disease was studied y comparing its effectiveness with the upper astrointestinal X-ray series. The 2 diagnostic ethods made the same diagnosis in 144 out of 200 xaminations, and in 56 cases only X-ray or only uodenoscopy could make a possible unequivocal iagnosis, thus increasing the number of correct iagnoses in each category to a number greater han either modality had acheived alone. Of the 9 duodenal ulcer patients, endoscopy diagnosed 5 and x-ray made the diagnosis 52 times but was n error in 10 cases. Duodenitis was correctly iagnosed 26 of 26 times by endoscopy and 15 of 6 times by X-ray. The deformed duodenal bulb rovided the greatest difficulty for the radiolo- ist. The lateral-viewing gastroscope was mployed 50 times and added information in 18 ases.

696 THE ACCURACY OF FIBREOPTIC ENDOSCOPY IN THE DIAGNOSIS OF GASTRIC CANCER. (E.) Thomas, E. (Queen Elizabeth Hosp., Woodville, ustralia), I. G. Hislop and A. K. Grant. *Aust. Z J. Surg.* 40(4):339-342, 1971.

he value of fibreoptic endoscopy in the confirmation of a radiological diagnosis of gastric ancer was studied in 61 patients in whom the iagnosis was later established by exfoliative cytology and laparotomy, autopsy, or both. A correct diagnosis was established in 85.7% (48) of the 56 patients in whom the procedure was successfully performed. There was a relatively low accuracy (73.3%) in diagnosing ulcerating malignancy endoscopically. Lesions of the antrum or prepyloric region were prone to diagnostic error, since they were at times difficult to visualize. A correct diagnosis was made in every instance of diffuse disease, involvement of the cardioesophageal region, the fundic region, and the greater curvature of the stomach. Instrumentation failed in 5 patients due to blockage by a tumor (3) or excessive premedication (2).

4697 DIAGNOSTIC VALUE AND COMPARATIVE STUDY OF RADIOLOGICAL SIGNS OBTAINED WITH CONVENTIONAL TECHNIQUES IN DISEASES OF THE PANCREAS. (Fr.) Guien, C. (St. Marguerite Hosp., Marseille, France) and R. Camatte. *Acta Gastroenterol. Belg.* 34(1):115-121, 1971.

Pancreatic calcification was found on abdominal surveys from 181 to 230 patients with chronic calcifying pancreatitis; 10 of 141 patients with pancreatic cancer (which developed from chronic calcifying pancreatitis in 6 patients), and 3 of 9 patients with benign tumors (1 angioma and 2 cystadenomas) of the pancreas. Of 82 patients with acute pancreatitis, 60 had abnormalities on abdominal surveys and 60 had abnormalities on chest x-rays. The most common of these were paralytic ileus of the small intestine (29 patients), pleuropulmonary manifestations (18 patients), and elevation of the pleural cupula (49 patients). Abnormalities of the stomach and duodenum were observed in 100 of 139 patients with chronic pancreatitis (72%), in 66 of 112 patients with cancer of the pancreas (59%), and in 15 of 32 patients with acute pancreatitis (46%). X-rays of the biliary tract revealed that 99 of 162 patients with chronic pancreatitis (61%) had abnormalities, primarily Caroli's Type I (50% of the entire group); 48 of 57 patients with cancer of the pancreas (84%) had abnormalities, primarily Caroli's Type V (complete obstruction at the upper edge of the pancreas; 55%). Of 82 patients with acute pancreatitis, only 15 had biliary tract abnormalities: choledocholithiasis in 8 patients and moderate dilation of the common bile duct in 7. Cholelithiasis caused acute pancreatitis in 45 patients (55%).

4698 NEW DYE METHOD FOR THE DIAGNOSIS OF LIVER DISEASES. (Rus.) Loginov, A. S. (All-Union Sci. Res. Inst. Gastroenterol., Moscow) and I. S. Klemashev. *Sov. Med.* 34(3): 14-17, 1971.

After i.v. injection of 0.5 mg/kg of Cardio Green, clearance was measured in 97 patients with liver disease and in 20 normal controls with the aid of a Cambridge sensor attached to the ear. Cardio Green clearance was decreased in 8 of 10 patients with fatty liver, 26 of 32 patients with chronic hepatitis, and 52 of 55 patients with cirrhosis. Patients with normal Cardio Green clearance values showed no abnormalities in serum transaminase, total protein, protein fractions, cholesterol, bilirubin, and prothrombin values or in serum flocculation tests. Cardio Green clearance values were more sensitive indications of disturbed liver function in patients with fatty liver than any other liver function test. Rather high Cardio Green clearance values were obtained in 3 patients with postnecrotic cirrhosis and cholestasis and in 2 patients with primary biliary cirrhosis, even though these patients had rather pronounced hemodynamic changes; this phenomenon is attributed to intrahepatic cholestasis.

4699 COMPARATIVE STUDY OF CONVENTIONAL X-RAYS AND RADIOCINEMATOGRAPHY IN MALPOSITION OF THE CARDIA AND FUNDUS AND HIATUS HERNIAS: STUDY OF 50 PATIENTS. (Fr.) Boutelier, P. and A. Béhar. *Arch. Fr. Mal. App. Dig.* 60(1-2):5-12, 1971.

By comparing conventional x-rays and radiocinematography it was found that radiocinematography was extremely valuable for evaluating the extent of gastroesophageal reflux which was present in 47 of 50 patients. Reflux was visualized only by radiocinematography in 20 patients. Although conventional x-rays showed no anomalies in 2 patients, radiocinematography revealed that one had a sliding hiatus hernia and the other, malposition of the cardia and fundus. Sliding hiatus hernias were also diagnosed by radiocinematography in 6 patients in which conventional x-rays showed only malposition of the cardia and fundus. Radiocinematography proved useful in diagnosing mixed hernias and in evaluating the reducibility of the hernia. Esophageal hypotonia was diagnosed in 16 of 42 patients by radiocinematography which also showed the presence of tertiary contractions in 11 patients and successive spasms in 3 patients. Esophageal stenosis was diagnosed only by radiocinematography in 4 of 17 patients with esophageal stenosis; the flexibility of the stenosis was also established by this method. Only 4 of these patients had peptic ulcers of the esophagus, 3 of which were visualized by both conventional x-rays and radiocinematography; 2 of these patients had brachyesophagus. Radiocinematography ruled out a diagnosis of esophageal ulcer and brachyesophagus in 1 patient with x-ray findings suggestive of these conditions.

4700 VALUE OF DETERMINING METHEMALBUMIN IN THE DIAGNOSIS AND TREATMENT OF ACUTE PANCREATITIS. (Fr.) Kiekens, R. (Brugmann Univ. Hosp., Brussels, Belgium), J. P. Govaerts and J. Van Geertruyden. *Acta Gastroenterol. Belg.* 34(1):96-104, 1971.

Serum methemalbumin was found in 15 patients with acute necrotic-hemorrhagic pancreatitis but not in 5 patients with acute necrotic pancreatitis or in 8 patients with acute edematous pancreatitis. Serum methemalbumin was also found in a patient with volvulus and in a patient with a retroperitoneal hematoma of unknown origin so that this test cannot be considered specific for pancreatitis.

4701 SELENOMETHIONINE SCINTIGRAPHY IN ACUTE AND CHRONIC PANCREATITIS. (Fr.) Leger, L. (Cochin Hosp., Paris), J. C. Roucayrol and J. P. Lenriot. *Acta Gastroenterol. Belg.* 34(1):159-168, 1971.

When pancreatic scans were made 8 days or less after the onset of acute pancreatitis, no selenomethionine uptake was found in 11 of 11 patients. This finding was of no prognostic value since 7 patients recovered rapidly without complications, 3 later developed chronic pancreatitis, and 2 died of pancreatic necrosis several days after the scans were made. Between 16 days and 6 months after onset, 35 scans were made: 22 were normal and 12 gave evidence of complications (total pancreatic necrosis in 2 patients, pseudocyst in 4 patients, pancreatic fistula in 1 patient, and chronic pancreatitis in 5 patients). Of 80 scans made on operated patients with chronic pancreatitis, 10 were normal, 5 could not be interpreted, and 65 revealed abnormalities. The incidence of abnormalities was higher in patients with lithiasic pancreatitis (94.2%) than in nonlithiasic pancreatitis (57.1%). Absence of selenomethionine uptake by the pancreas was closely correlated with the extent of parenchymal sclerosis.

4702 EVALUATION OF A SYSTEMATIC STUDY OF α_1-FETOPROTEIN IN 224 PATIENTS WITH LIVER DISEASE. (Fr.) Geffroy, Y. (Charles-Nicolle Hosp., Rouen, France), J. Boureille, P. Denis, R. Colin and P. Métayer. *Sem. Hop. Paris* 47(20):1281-1285, 1971.

By means of Ouchterlony's diffusion technique it was demonstrated that α_1-fetoprotein was present in sera from 9 of 18 patients with primary liver cancer, 4 of 31 patients with liver metastases from gastric carcinomas, and in none of 112 patients with cirrhosis; weak positive tests for α_1-fetoprotein were found in 1 of 22 patients with viral hepatitis (10-23 days after onset of jaundice) and in 1 of 7 patients with primary hemochromatosis, but negative tests were obtained later. α_1-Fetoprotein was also found in tumors of 3 patients with primary liver cancer and in a gastric carcinoma and liver and lymph node metastases in 1 patient. These findings demonstrate that α_1-fetoprotein is a good screening test for hepatomas, but that negative results do not rule out the diagnosis of a hepatoma.

4703 THE DIAGNOSIS OF HEPATOBILIARY DISEASES BY SERUM ENZYME ANALYSES. (E.) Konttinen, A. (U. Helsinki 1st Dept. Med., Finland), V. Hupli and K. Salmenkivi. *Acta Med. Scand.* 189(6):529-535, 1971.

Subjects included patients with hepatitis (32), biliary obstruction by primary or metastatic tumors (20), extrahepatic benign biliary obstruction (29), and hepatic cirrhosis (24) and healthy controls (30). Overall in the 105 patients abnormal levels of serum guanase were seen in 57%, of γ-glutamyl transpeptidase in 90%, of ornithine carbamoyl transferase in 81%, of glutamic oxaloacetic transaminase in 84%, of glutamic pyruvic transaminase in 84% and of alkaline phosphatase in 81%. Serum guanase was especially elevated in hepatitis as was glutamic pyruvic transaminase, which was also elevated in obstruction. The opposite relationship was seen with alkaline phosphatase and γ-glutamyl transpeptidase. With simultaneous determinations of serum levels, the hepatocellular index was characterized by a greater rise of guanase and the obstructive index by a greater rise of alkaline phosphatase. When serum levels of guanase and γ-glutamyl transpeptidase were compared, misleading results were obtained in 13 of 60 patients. The serum transpeptidase levels was found to be more abnormal with obstruction than with hepatitis. Enzyme levels did not correlate well with bilirubin levels, but, in general, were more clearly elevated in patients with hyperbilirubinemia. In patients who were not jaundiced and who were normobilirubinemic, the serum γ-glutamyl transpeptidase was more distinctly abnormal and somewhat more often pathological.

4704 AUTOMATIC DETERMINATION OF SERUM BILIRUBIN. (Ger.) Bartels, H. (Basel Civil Hosp., Switzerland) and M. Böhmer. *Z. Klin. Chem. Clin. Biochem.* 9(2):133-135, 1971.

Methods are described for continuous and discontinuous automated determinations of total serum bilirubin in the AutoAnalyzer and Perkin-Elmer C4, resp. Bilirubin is coupled with the diazonium salt of 2-chloro-4-nitroaniline stabilized with naphthalene-1,5-disulfonic acid in the presence of the detergent, Ultravon, a long-chain methoxylated alcohol. Diazotized 2-chloro-4-nitroaniline is very specific for bilirubin and hemoglobin causes little interference; blanks are not required with clear sera when measurements are made at 660 mμ; and Ultravon even disperses sera with high concentrations of lipids. The reagents are quite stable, only small samples are required, and the reaction is complete in 4 min.

4705 ENDOSCOPIC PHOTOGRAPHY, BIOPSY, AND CYTOLOGY OF THE ESOPHAGUS AND STOMACH WITH THE OLYMPUS FIBERESOPHAGOSCOPE. (E.) Bautista, A. and V. A. DeLuca, Jr. (Griffin Hosp., Derby, Conn.). *Gastroenterology* 60(2):294-298, 1971.

The Olympus EF Fiberesophagoscope allowed ease of passage, minimal patient distress, and examination of the entire esophagus and often the upper ½ of the stomach. The instrument allows 90° bending angle of its head, fully automatic exposure control of light source with direct, through an external camera observation, pushbotton control of aspiration, insufflation of fluid feeding, and a separate biopsy channel. The instrument visualized a gastric ulcer of the fundus and a fundal polyp, both not well seen by the gastrocamera. Tumors, erosions, sources of hemorrhage, and large varices were distinctly identified on photographs. The opportunity of having good quality photographs of each esophagoscopic examination is of distinct value for permanent review of endoscopic observations and offers a valuable teaching aid.

4706 THE COEFFICIENT OF SORBOSE DEHYDROGENASE ACTIVITY - GLUTAMATE DEHYDROGENASE ACTIVITY IN THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE. (Rus.) Riapossova, I. K. and A. I. Khasanov. *Lab. Delo* (1):31-33, 1971.

4707 VALUE OF PHARMACORADIOGRAPHY WITH MORPHINE IN CONTRAST VISUALIZATION OF THE BILIARY TRACT. (Ger.) Kocher, W. (Ernst Moritz Arndt U. Surg. Clin., Greifswald, Germany), P. Fritzsche and J. Ott. *Zentralbl. Chir.* 96(16):536-541, 1971.

4708 DIAGNOSIS OF LIVER CANCER BY SCINTISCANNING WITH SELENOMETHIONINE. (Fr.) Caroli, J. (St. Antoine Hosp., Paris), G. Milhaud and J. De Saint Laurent. *Rev. Med. Chir. Mal. Foie* 46(2):69-74, 1971.

4709 SYSTEMATIZATION OF X-RAY FINDINGS ON THE UPPER GASTROINTESTINAL TRACTS FOR COMPUTER ANALYSIS. (Jap.) Inamoto, K. (Adult Dis. Ctr., Osaka, Japan), H. Matsuda and T. Suzuki. *Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.)* 30(9):791-800, 1970.

4710 A COMPARATIVE ASSESSMENT OF SOME PHOSPHATASE TESTS IN THE DIAGNOSIS OF DISEASES OF THE HEPATOBILIARY SYSTEM AND INTESTINE. (Rus.) Frolkis, A. V. and L. I. Antokhina. *Klin. Med. (Mosk.)* 49(2):77-82, 1971.

4711 RADIOISOTOPES IN THE DIAGNOSIS OF GASTROINTESTINAL DISORDERS. (E.) Ganatra, R. D. (Tata Mem. Hosp., Bombay, India). *Indian Pract.* 24(1):49-54, 1971.

4712 BILIRUBIN AND ALKALINE PHOSPHATASE CLEARANCE FROM BLOOD PLASMA BY PERFUSION THROUGH ACTIVATED CARBON. (E.) Barakat, T. (U. Liverpool Dept. Surg., England) and I. W. Macphee. *Br. J. Surg.* 58(5):355-358, 1971.

4713 COMPARATIVE EXAMINATIONS OF ENDOSCOPIC AND SCINTIGRAPHIC FINDINGS IN THE STOMACH. (Ger.) Seifert, E. (Tech. U. Dept. Intern. Med., Hanover, Germany), H. Hundeshagen and F. Paul. *Endoscopy* 3(1):34-37, 1971.

4714 ULTRASONIC DIAGNOSIS IN ABDOMINAL AND CHEST CONDITIONS AND ECHO ENCEPHALOGRAPHY. (Ger.) Kratochwil, A. (Univ. 2nd Gynecol. Clin., Vienna). *Diagnostik* 4(2):43-46, 1971.

4715 THE UTILIZATION OF INTRAVENOUS CHOLANGIOGRAPHY IN THE DEMONSTRATION OF COMMON DUCT FOREIGN BODIES. (E.) Maida, J. W. (Mt. Sinai Hosp., Miami Beach, Fla.), G. Kratz and L. O. Martinez. *Br. J. Radiol.* 44(521): 388-392, 1971.

4716 TECHNIC IN THE EXAMINATION OF GASTRIC AND INTESTINAL MUCOSA BIOPSIES. (Ger.) Eder, M. (Univ. Pathol. Inst., Munich, Germany). *Beitr. Pathol. Anat.* 142(3):334-335, 1971.

4717 HISTOLOGICAL TECHNIC IN THE EXAMINATION OF LIVER BIOPSIES. (Ger.) Gedigk, P. (Univ. Pathol. Inst., Bonn, Germany), R. Muller and H. Bechtelsheimer. *Beitr. Pathol. Anat.* 142(3):336-340, 1971.

4718 DIAGNOSIS OF LESIONS ON THE LESSER CURVATURE BELOW THE CARDIA BY REVERSE U TURN METHOD, WITH THE FIBERSCOPE. (E.) Hayashi, T. (Nihon U. Sch. Med., Tokyo), M. Okada and A. Iwasaki. *Endoscopy* 3(1):41-44, 1971.

4719 SEROLOGIC DIAGNOSIS OF DIGESTIVE PARASITIC INFECTIONS. (Fr.) Gigase, P. L. (Nationalestr. 155, Antwerp, Belgium). *Acta Gastroenterol. Belg.* 34(3):329-331, 1970.

4720 FALSE POSITIVE LIVER SCANS SIMULATING INTRAHEPATIC NEOPLASMS. (Jap.) Katsube, Y. (Univ. Med. Sch., Tottori, Japan), T. Higashiura and A. Takeshita. *Jap. J. Nucl. Med.* 7(6):384-390, 1970.

4721 SENSITIVE MATRIX GEL DIFFUSION TEST FOR THE DETECTION OF AUSTRALIA ANTIGEN. (E.) Hartwell, W. V. (Ecol. Invest. Program Dis. Control Ctr., Phoenix, Ariz.), J. E. Maynard and K. R. Berquist. *Appl. Microbiol.* 21(4):623-625, 1971.

4722 OPERATIVE CHOLANGIOGRAPHY AS A DIAGNOSTIC PROCEDURE AND AS AN AID IN SELECTING THE SURGICAL TREATMENT OF CHOICE. (Pol.) Sadlinski, C. (Med. Acad 3rd Surg. Clin., Bytom, Poland), M. Martula, E. Mansfeld and W. Switalski. *Pol. Przegl. Chir.* 42(12):1818-1827, 1970.

See also numbers: 4627, 4701, 5123, 5296

GASTROINTESTINAL DISEASES

ESOPHAGUS

4723 CARDIOSPASM AND ESOPHAGEAL DYSKINESIA. (Sp.) Andréu Oller, L. (Santa Cruz San Pablo Hosp., Barcelona, Spain) and J. M. Andréu Morato. *Rev. Esp. Enferm. Apar. Dig.* 33(4):415-434, 1971.

Radiological examinations performed on 189 patients showed that 150 had cardiospasm, 8 had hypertonic or irritable esophagus, 8 had hypotonic or atonic esophagus, 14 had megaesophagus, 7 had dolichomegaesophagus, and 2 had isolated esophageal spasm. Atropine sulfate (1 mg) and pilocarpine (10 mg) had no effect on 12 patients with cardiospasm. Amylnitrite and nitroglycerine (2-3 drops of a 1% solution sublingually) gave prompt and short-lasting relief but caused tachycardia and a feeling of suffocation in some patients. Large doses of sodium nitrite, nitroglycerin tablets, and acetylcholine, administered alone or in combination, were less effective. The best results were obtained with effervescent drinks given before meals as palliative therapy. Esophageal lavage with physiological saline was given on alternate days to patients with cardiospasm, esophageal dilatation, and food retention. Patients with associated esophagitis benefited from a combination of tetracycline (250 mg) and prednisone (5 mg) administered every 6 hr. Psychotherapy and medication consisting of belladonna, physostigmine, papaverine, vitamin B complex, tranquilizers, and sedatives caused improvement in patients with dysphagia and psychic trauma, but treatment did not relieve cardiospasm. Dilatation of the cardia with an inflatable balloon gave excellent results, but 3 patients developed perforations which were repaired surgically. Of 8 patients who underwent Heller's cardiotomy, 1 developed a hiatus hernia as a postoperative complication.

4724 PRIMARY SURGICAL TREATMENT FOR ESOPHAGEAL ACHALASIA. (E.) Effler, D. B. (Cleveland Clin. Found., Ohio), F. D. Loop, L. K. Groves and R. G. Favaloro. *Surg. Gynecol. Obstet.* 132(6):1057-1063, 1971.

Subjects consisted of 100 patients with achalasia who underwent transthoracic anterior esophagomyotomy with reconstruction of the esophageal hiatus. Of the 100, 51 were treated by dilatation before direct surgical operation and none had received any lasting benefit. Pulmonary complications secondary to nocturnal aspiration of retained esophageal contents occurred in 24, and 8 had roentgenographic evidence of localized pulmonary fibrosis. There were no operative or hospital deaths and 95 were available for follow-up for 1-18 years (mean, 7.8). Of these, 94 showed improvement, which was considered good or excellent in 87. Of the 14 who died during this study, none had any symptoms of gastroesophageal reflux prior to death nor did any of these die as a result of esophageal diseases. Of the remaining 81, 6 complained of pyrosis of variable frequency and intensity. Five of these 6 were restudied and 2 showed signs of gastroesophageal reflux while the other 3 had motility problems associated with delayed emptying of the esophagus, although none of the latter 3 have demonstrated hiatal hernia or ulceration of the distal esophagus. Of the 10 patients who had concomitant hiatal hernia with achalasia, all were available to follow-up and none experienced symptoms related to reflux esophagitis. The major pitfalls of this surgical procedure include incomplete myotomy, mucosal perforation and surgically induced gastroesophageal reflux.

4725 MECHANISM OF PYROSIS. A CLINICAL STUDY. (E.) Rudolph, I., A. F. Herrera (Presbyterian-U. Pennsylvania Med. Ctr., Philadelphia), G. N. Stein and J. L. A. Roth. *Am. J. Dig. Dis.* 16(7):577-588, 1971.

Gastroesophageal reflux and esophageal motility were measured in 7 patients with organic pyrosis, 11 patients with functional pyrosis and 5 normal controls to determine if the functional patient sustains his symptom by a different mechanism than the patient with an organic lesion. All 7 patients with organic lesions demonstrated reflux while only 7 of the 11 in the functional group and none of the normals showed reflux. Acid perfusates produced pyrosis in 83% of the functional patients and 85% of the organic group. Incongruous responses with alkaline perfusates were seen in both groups. Pyrosis elicited motility changes in 66% of the functional group and 76% of the patients with organic lesions. A similar mechanism seems to produce pyrosis in the functional and organic patients.

4726 PALLIATIVE INTUBATION OF THE ESOPHAGUS. ANALYSIS OF 59 CASES. (E.) Ammann, J. F. and J. L. Collis (Queen Elizabeth Hosp., Birmingham, England). *J. Thorac. Cardiovasc. Surg.* 61(6):863-869, 1971.

Subjects consisted of 59 patients with esophageal carcinoma who underwent palliative intubation of the esophagus for dysphagia either after exploration or as primary therapy. Modified Souttar tubes (push-through) were inserted in 30 patients, 10 of whom had been explored, while Mouseau-Barbin tubes (pull-through) were inserted in 29, of whom 12 had been subjected to exploratory thoracolaparotomy. In those with Souttar tubes, histology was that of squamous carcinoma in 23, adenocarcinoma in 6 and unknown in 1, while in the Mouseau-Barbin group, 15 had squamous carcinoma, 8 adenocarcinoma and 6 had no histology. With the Souttar tube the mean duration of hospitalization was 5.4 days for all but 1 patient, with a mean survival time of 156 days after insertion of the tube. The longest survival was 541 days, while the longest post-operative course without complications was 378 days. Swallowing was markedly improved in 17, 3 of whom also had fistulas. Of the 10 intubated with Souttar tubes after exploration, the mean survival after operation was 125.8 days and the maximum 230 days; swallowing was satisfactory in 9, with a mean length of hospitalization of 17 days. After primary insertion of the Mouseau-Barbin tube, the mean length of hospitalization was 15.2 days, the mean survival was 73.6 days (maximum 351 days) and 15 of 17 showed a marked improvement in swallowing. In 12 receiving the Mouseau-Barbin tube after exploration, the mean length of hospitalization was 14.4 days, the mean survival was 62.8 days (maximum 171 days) and swallowing remained satisfactory in 6 of 8 patients discharged from the hospital.

4727 THE ESOPHAGOGASTRIC JUNCTION. (E.) Katz, D. (New York Med. Coll., N. Y.) and F. Hoffman (Eds.). *Amsterdam, Excerpta Medica,* 1971. 167 pp.

Manometric and potential difference techniques for locating the esophagogastric junction, its role in preventing acid peptic reflux, and disorders affecting the contractile activity of this sphincter are described. The causes and management of bleeding from the esophagogastric junction, diagnosis of morphological and functional disorders in this region, and the conservative and surgical treatment of hiatus hernia are discussed.

4728 POSTERIOR GASTROPEXY (HILL) IN THE TREATMENT OF REFLUX ESOPHAGITIS. AN EXPERIMENTAL STUDY IN THE DOG. (E.) Castro, V. A. M. (U. Illinois Abraham Lincoln Sch. Med., Chicago), L. M. Nyhus, E. W. Gillison, A. Nakayoshi and C. T. Bombeck. *Scand. J. Gastroenterol.* 6(Suppl. 9):49-55, 1971.

Circumferential esophagogastric myomectomy was performed in 42 dogs and various operative procedures were done in the 31 survivors to determine the merit of these procedures in treating gastric reflux esophagitis. Following recovery from the initial surgery, dogs were subjected to either: no further surgery, simple posterior gastropexy, posterior gastropexy with invagination of the lesser curve, or the last procedure with a suture-narrowing of the angle of His, after which all dogs received 30 mg of histamine in beeswax-sesame oil s.c. daily. Flouroscopy and endoscopy revealed that all 4 methods were successful in preventing hiatal herniation, but none of the 4 procedures was successful in preventing reflux, the worst results being in the first 3 groups.

4729 ROLE OF GASTRIN SUPERSENSITIVITY IN THE PATHOGENESIS OF LOWER ESOPHAGEAL SPHINCTER HYPERTENSION IN ACHALASIA. (E.) Cohen, S. (U. Pennsylvania Hosp., Philadelphia), W. Lipshutz and W. Hughes. *J. Clin. Invest.* 50(6):1241-1247, 1971.

Subjects consisted of 20 normals and 19 patients with untreated achalasia. A quadruple-lumened catheter was used to measure intraluminal pressures at 3 sites in the esophagus and to permit gastric instillation of 0.1 N HCl. In baseline studies, the mean lower esophageal sphincter pressure was 19.4 mm Hg in controls and 50.5 mm Hg in those with achalasia. In both groups the mean lower esophageal sphincter pressure was lowered with instillation of 0.1 N HCl at 12 mEq/15 min with a 68.4% decrease in normals and an 86.9% decrease in those with achalasia. With gastric acidification, the % reduction in this pressure was significantly different in the 2 groups although the end point was not. Baseline serum gastric levels did not differ significantly between the 2 groups, nor were these serum levels correlated with the lower esophageal schincter pressures. After i.v. administration of exogenous gastrin, the peak effect on lower esophageal sphincter pressure reached 460% of basal and was attained with 0.7 µg/kg of gastrin I, in normals, while it reached 433% of basal in response to 0.25 µg/kg in those with achalasia and the difference in doses was significant. The dose response curve in patients successfully treated by pneumatic dilatation still showed an increased sensitivity to exogenous gastrin I.

4730 THE PLACE OF FUNDOPLICATION IN THE TREATMENT OF HIATAL HERNIA. (E.) Morgan, A. G. (Wellington Hosp., New Zealand). *Aust. NZ J. Surg.* 40(4):329-338, 1971.

A group of 28 patients who underwent fundoplication as treatment for hiatal hernia were compared with 25 patients treated by other operations. Twenty-three of the former 28 patients were followed for 6 months to 3 yr. Clinical and radiological data indicated that fundoplication provided complete control of reflux in over 95% of the patients making it more successful than the other operations (vagotomy and pyloroplasty, pyloromyotomy). Residual symptoms and operative sequelae were less common and less severe in those patients who underwent fundoplication. Patients with severe reflux esophagitis seem to benefit from fundoplication in addition to repair of the hiatus. Studies in cadavers indicated that the fundal cuff encircling the lower esophagus has a positive valve action preventing reflux.

731 ESOPHAGEAL ATRESIA IN CENTRAL AFRICA. (Fr.) Renoirte, P. (U. Louvain Clin., elgium), J. C. Schoevaerdts and E. Wibin. *Acta aediatr. Belg.* 25(1):45-62, 1971.

a 13-yr period esophageal atresia was diagnosed 13 African infants (4 girls and 9 boys) and 3 European infants (2 girls and 1 boy). Other nomalies were present in 7 of the 13 African atients; they included anomalies of the heart 5), gastrointestinal tract (2), urinary tract 2), and respiratory tract (1). Anal imperforation nd stenosis were diagnosed in 2 patients. xcept for 1 patient in whom the esophageal istula opened into the tracheal carina, fistulas the distal segment of the esophagus opened nto the trachea. Surgery was performed in 15 these 16 patients to ligate the esophagotracheal istula and to establish esophageal continuity henever possible; 7 patients survived. In one atient with tracheal stenosis the esophagotracheal istula was ligated and, since an end-to-end nastomosis could not be performed, surgery was ompleted by cervical esophagostomy and gastrostomy. hen the trachea had reached a large enough iameter to permit intubation 2 yr later, a 2-tep esophagoplasty was performed and good esults were obtained.

732 MANAGEMENT OF ACHALASIA BY TRANSABDOMINAL CARDIOMYOTOMY AND FUNDOPLICATION. (E.) enguy, R. (U. Chicago Pritzker Sch. Med., Ill.). urg. *Gynecol. Obstet.* 133(3):427-431, 1971.

issen fundoplication for the prevention of sophageal reflux was performed after cardiotomy 6 patients for whom dilatation was not beneficial controlling their symptoms. The patients were tudied postoperatively for no less than 10 onths by esophageal cinefluorography with attempts ade to provoke esophageal reflux by gravity and the Valsalva maneuver. In none of the patients as reflux observed, and excellent symptomatic elief was obtained in all cases. This procedure ffords one the possibility of managing accidental ntry into the esophageal or gastric lumen during ardiomyotomy.

733 REOPERATION FOR ACHALASIA OF THE ESOPHAGUS. (E.) Patrick, D. L. (Mayo lin., Rochester, Minn.), W. S. Payne, A. M. lsen and F. H. Ellis, Jr. *Arch. Surg.* 103(2): 22-128, 1971.

a 22-yr period (1949-1970), 21 patients underent reoperation for intractable esophageal ymptoms subsequent to a previous surgical rocedure for achalasia. These patients required dditional surgical treatment either because of ersistent obstructive achalasia (13) or because f cardia incompetence (8) with subsequent development of reflux esophagitis and stricture. In both groups chief complaints were severe dysphagia, persistent regurgitation, weight loss, and heartburn. Persistent achalasia with esophageal obstruction had been caused chiefly by complete or partial healing of a previous improperly performed esophagomyotomy. Myotomy was successfully performed on these patients such that the dissection of the muscularis from the circumference of the esophageal mucosa was adequate to allow the latter to protrude through the myotomy and prevent it from healing. Incompetence of the cardia apparently followed operations which totally destroyed or bypassed the distal esophageal sphincter. The resultant lower esophageal stricture required resection for relief at reoperation.

4734 TREATMENT OF REFLUX STRICTURES OF THE OESOPHAGUS BY THE NISSEN ROSSETTI OPERATION. (E.) Kent Harrison, G. (St. Thomas Hosp., London) and B. M. Gompels. *Thorax* 26(1):77-80, 1971.

4735 LYE INGESTION CAUSING PYLORIC STENOSIS WITHOUT ESOPHAGEAL INJURY. (E.) Asch, M. J. (Columbia U. Dept. Surg., New York, N. Y.) and F. P. Herter. *NY State J. Med.* 71(4):455-457, 1971.

4736 TOTAL ESOPHAGECTOMY AND DESCENDING COLON BYPASS FOR SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS. (E.) Vincent, R. G. (Roswell Park Mem. Inst., Buffalo, N. Y.) and J. H. Webster. *Am. J. Surg.* 121(5):527-530, 1971.

4737 ATRESIA OF THE ESOPHAGUS. ITS OPERATION AND COURSE. (Sp.) Rosa, F. (Sch. Med., Montevideo, Uruguay). *Cir. Uruguay* 40(1): 12-15, 1970.

4738 ESOPHAGEAL STENOSIS DUE TO HIATUS HERNIA. (Ger.) Von Ekesparre, W. (Walddorfer Pediatr. Hosp., Hamburg, Germany). *Z. Kinderchir.* 9(3/4):317-324, 1971.

4739 LONG TERM RESULTS AFTER PRIMARY REPAIR OF OESOPHAGEAL ATRESIA AND TRACHEO-OESOPHAGEAL FISTULA. (E.) El Shafie, M. (Alder Hey Child. Hosp., Liverpool, England) and P. P. Rickham. *Z. Kinderchir.* 9(3/4):309-316, 1971.

4740 A RARE CASE OF NONFATAL, RECURRING HEMORRHAGE FROM GASTRO ESOPHAGEAL VARICES

(Ger.) Zaversnik, H. (Trubarjeva 5b, Celje, Yugoslavia). *Wien. Med. Wochenschr.* 121(5):78-80, 1971.

4741 THE DIAGNOSIS AND TREATMENT OF STRANGULATED TRAUMATIC HIATUS HERNIA. (Rus.) Gershman, B. M. and G. B. Katkovskii. *Vestn. Khir.* 106(1):71-73, 1971.

4742 ROENTGENOCINEMATOGRAPHY OF THE ARTIFICIAL ESOPHAGUS MADE OF LARGE INTESTINE. (Rus.) Grigorian, G. O. and A. G. Vinnichenko. *Sov. Med.* 34(1):147-148, 1971.

4743 SPONTANEOUS PERFORATIONS OF THE ESOPHAGUS. (Hun.) Csorba, L., L. Gombar, M. Loke and E. Svastits. *Orv. Hetil.* 112(8):450-452, 1971.

4744 OESOPHAGEAL ATRESIA: RESULTS OF TREATMENT. (E.) Glasson, M. J. (Roy. Alexandra Hosp. Child, Sydney, Australia), D. L. Dey and D. H. Cohen. *Med. J. Aust.* 1(2):69-72, 1971.

4745 THE SIGNIFICANCE OF DILATATION IN THE COURSE OF ESOPHAGEAL DISORDERS. (Fr.) Lequerler, Y. (Bichat Hosp., Paris) and C. Debray. *Gaz. Med. Fr.* 78(7):989-992, 1971.

4746 PERFORATION OF ESOPHAGUS AFTER THE CAUTERIZING ACTION OF 40% ESSENCE OF VINEGAR. (Ger.) Kessler, L. (Med. Acad., Magdeburg, Germany) and H. Bonn. *Dtsch. Gesundheitsw.* 26(2):76-77, 1971.

4747 SURGICAL MANAGEMENT OF MOTILITY DISTURBANCES OF THE ESOPHAGUS AND CARDIA. (E.) Ellis, F. H., Jr. (Lahey Clin. Found., Boston, Mass.). *Del. Med. J.* 43(3):61-67, 1971.

4748 PEPTIC ESOPHAGITIS. (Fr.) Baulieux, J., P. Vuillard and L. Fischer. *Cah. Med. Lyon* 47(7):575-594, 1971.

4749 SUBTOTAL COLONIC REPLACEMENT OF THE OESOPHAGUS IN INFANCY. (E.) Singh, A. (Alder Hey Child. Hosp., Liverpool, England) and P. P. Rickham. *Br. J. Surg.* 58(5):377-381, 1971.

4750 SPONTANEOUS RUPTURE OF ESOPHAGUS. (E.) Bree, R. L. (St. Joseph's Hosp., Phoenix, Ariz.). *Ariz. Med.* 28(2):101-104, 1971.

4751 HIATAL HERNIA: CHANGING CONCEPTS OF TREATMENT. (E.) Jacobson, M. J. (Chicago Med. Sch., Ill.). *Am. Fam. Physician GP* 3(5):107-112, 1971.

4752 SYMPOSIUM ON THE TREATMENT OF ESOPHAGEAL ATRESIA. (Fr.) Petit, P. *Ann. Chir. Infant.* 11(6):359-486, 1970.

4753 ESOPHAGEAL ATRESIA WITH EXOTRACHEAL FISTULA (SURGICAL RECOVERY). (Rum.) Fufezan, V. (Surg. Clin., Timisoara, Rumania), C. Duica and E. Habenicht. *Chirurgia (Bucur.)* 19(12):1135-1139, 1970.

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4755 SURGICAL INDICATIONS IN POSTCAUSTIC ESOPHAGEAL STENOSES. (Rum.) Gavriliu, D. (Carol Davila Hosp., Bucharest, Rumania), E. Albu and M. Stoian. *Otorinolaringologie* 15(6):433-439, 1970.

4756 A RARE CASE OF HIATUS HERNIA AND EVAGINATION OF THE MUCOSA COMPLICATING GASTRIC RESECTION. (It.) Pipani, A. (Civil Hosp., Cesenatico, Italy). *Romagna Med.* 22(4): 345-354, 1970.

4757 COLON BYPASS OF THE ESOPHAGUS. (E.) Stephens, H. B. (U. California Dept. Surg., San Francisco). *Am. J. Surg.* 122(2): 217-222, 1971.

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4759 BRACHYESOPHAGUS. (It.) Bifani, I. (Univ. Inst. Pediatr. Surg., Naples, Italy). *Rass. Clin. Sci. Ist. Biochim. Ital.* 46(11):297-302, 1970.

4760 HARING'S ESOPHAGEAL ENDOPROSTHESIS IN THE PALLIATIVE TREATMENT OF CANCER OF THE ESOPHAGUS. (Sp.) Buzzi Matthews, G. (Vecinal Hosp., Lanus, Argentina), A. Garcia Iglesias and M. Adema. *Rev. Argent. Cir.* 18(3-4): 123-129, 1970.

4761 PERFORATION OF THE ESOPHAGUS. SURGICAL MANAGEMENT. (Sp.) Arauz, J. C., J. J. Boretti and S. Magaro. *Rev. Argent. Cir.* 18(3-4):193-209, 1970.

4762 SLIDING HIATUS HERNIA IN YOUNG SUBJECTS. (Pol.) Kowalski, W. (Piotrkow Trybunalski, Poland). *Wiad. Lek.* 23(23):2053-2055, 1970.

4763 ESOPHAGEAL REFLUX ULCERATION. CAUSES AND SURGICAL MANAGEMENT. (E.) Payne, W. S. *Surg. Clin. North Am.* 51(4):935-943, 1971.

4764 CONGENITAL POSTEROLATERAL DIAPHRAGMATIC HERNIA IN INFANTS. (E.) Livaditis, A. (Karolinska Hosp., Stockholm) and A. Nordstrand. *Scand. J. Cardiovasc. Surg.* 5(1):67-73, 1971.

4765 ESOPHAGEAL DYSFUNCTION AND OTHER SWALLOWING DIFFICULTIES IN EARLY LIFE. (E.) Ferguson, C. F. (Harvard. Med. Sch., Boston, Mass.). *Ann. Otol. Rhinol. Laryngol.* 80(4): 541-548, 1971.

4766 CURRENT MANAGEMENT OF CORROSIVE ESOPHAGITIS. AN EVALUATION OF RESULTS IN 239 CASES. (E.) Cardona, J. C. (New York U. Bellevue Med. Ctr., N. Y.) and J. F. Daly. *Ann. Otol. Rhinol. Laryngol.* 80(4):521-527, 1971.

4767 THE RATIONALE OF EMERGENCY ESOPHAGOGASTRECTOMY IN THE TREATMENT OF LIQUID CAUSTIC BURNS OF THE ESOPHAGUS AND STOMACH. (E.) Ritter, F. N. (U. Michigan Med. Ctr., Ann Arbor), O. Gago, M. M. Kirsh, R. M. Komorn and T. O. Orvald. *Ann. Otol. Rhinol. Laryngol.* 80(4): 513-520, 1971.

4768 UNINTENTIONAL ESOPHAGEAL INTUBATION IN THE NEWBORN. (E.) Stool, S. E. (U. Pennsylvania Sch. Med., Philadelphia), D. Johnson and P. A. Rosenfield. *Pediatrics* 48(2):299-301, 1971.

See also numbers: 4699, 4705, 4776

4769 EFFECT OF CATAPRESAN [2-(2,6-DICHLOROANILINO)-2-IMIDAZOLINE] ON GASTRIC SECRETION AND EXPERIMENTAL ULCERS. (Fr.) Boissier, J.-R. (Sch. Med., Paris), J.-F. Giudicelli, S. Larno and J. Fichelle. *Journal de Pharmacologie (Paris)* 1(1):109-122, 1970.

During continuous perfusion of the stomach of fasted urethan-anesthetized rats under artificial respiration, Catapresan (10-100 μg/kg i.v.) caused no changes in the pH of perfusion fluid and did not inhibit acid secretion caused by vagal stimulation or administration of acetyl-β-methylcholine (25 μg/kg i.v.). Pretreatment with Catapresan (0.03-10 mg/kg) inhibited development of ulcers produced in rats by restraint, reserpine, and pyloric ligation, but had little effect on those caused by histamine and no effect on those caused by serotonin. The central depressant action of Catapresan appears to account for its protective effect against reserpine and restraint-induced ulcers. It probably protects against ulcers caused by pyloric ligation by decreasing gastric acidity and exerting a central sympatholytic action.

4770 BONE ABNORMALITIES AFTER GASTRIC SURGERY. A PROSPECTIVE HISTOLOGICAL STUDY. (E.) Garrick, R. (Sydney Hosp., Australia), A. W. Ireland and S. Posen. *Ann. Intern. Med.* 75(2):221-225, 1971.

Biopsies of the iliac crest were performed in 36 patients who had undergone gastrectomy 3-9 years previously for nonmalignant diseases. Measured parameters included serum calcium and alkaline phosphatase; roentgenograms of the skull, thoracic and lumbar spines, chest, pelvis, hands and one femur; scanning of cancellous bone. Total bone index was the area occupied by calcified and uncalcified bone, expressed as a % of the area scanned. Osteoid index was the area occupied by uncalcified bone, expressed as a % of the area scanned. Demineralization index was 100 times the ratio of the osteoid/total bone indices. Gastrectomized patients had significantly less total skeletal tissue and more uncalcified osteoid than controls. There were 15 patients with an osteoid index greater than 2 standard deviations from the normal mean and 6 patients with total bone indices below 2 standard deviations from the normal mean; 5 had both abnormalities. Although the prevalence of osteomalacia did not vary with the type of gastrectomy, all 5 patients with severe osteomalacia (demineralization index of 8.1% or more) were women who underwent a Polya type gastrectomy 7-9 yr previously, but this finding was not statistically significant. It is concluded that significant osseous histological changes may be found in the absence of biochemical, clinical or roentgenographic abnormalities.

4771 ASPIRATION BIOPSIES OF THE STOMACH AFTER ADMINISTRATION OF PHENYLBUTAZONE. (Ger.) Zimmermann, U. (Wittenberge Hosp., Germany) and G. Möbius. *Dtsch. Z. Verdau. Stoffwechselkr.* 30(3):177-184, 1970.

Aspiration biopsies from the corpus ventriculi, performed on 15 women before and after administration of phenylbutazone (3.8-17.0 g p.o. or parenterally over 7-40 days), showed only 1 patient had a normal gastric mucosa: 2 patients had chronic atrophic gastritis, 3 had chronic gastritis with partial atrophy of the mucosa, and 9 had chronic superficial gastritis. All 15 patients had mild to moderate epigastric pain. A 33-yr-old woman developed hematemesis 44 days after institution of phenylbutazone therapy (4.2 g parenterally and 12.8 g p.o.), but no radiological evidence of an ulcer was found.

4772 A SERIES OF 100 OPERATED PATIENTS WITH STOMACH CANCER WHO WERE FOLLOWED FOR 5 YEARS. COMMENTS AND THOUGHTS. (Fr.) Roux, M. (Vaugirard Hosp., Paris), P. Vayre, J.-P. Lassau and A. Chevallard. *J. Chir. (Paris)* 101(4): 377-388, 1971.

Among 100 operated patients (56 men and 44 women, mean age 65 yr) with stomach cancer, only 17% of the total and 27.4% of those followed regularly survived for 5 yr. Tumors had extended to other organs in 37 patients, and 30 patients had gross signs of lymph node involvement. Curative surgery was performed on 57 patients and palliative surgery on 30; total gastrectomies had to be performed on 32 patients. Symptoms included weight loss in 60%, pain in 50%, ulcer symptoms in 16% (only 4 patients actually had ulcers), gastrointestinal bleeding in 10%, and a palpable epigastric tumor in 10%. All 10 patients with palpable tumors died within 4 months of diagnosis. Except for very extensive tumors, the 5-yr survival rate did not depend upon the tumor site or the type of operation performed but was related to tumor size and tumor histology. The 5-yr. survival rate was 40% in patients with tumors less than 4 cm in diameter but was only 6% in patients with larger tumors. None of the 40 patients with undifferentiated carcinomas survived for 5 yr. The operative mortality was highest among patients with tumors in the cardia and fundus (50%) and lowest among patients with antral and pyloric tumors (6%). Patients who underwent subtotal lower gastrectomy had the lowest surgical mortality.

4773 THE INFLUENCE OF DIMETHYL-BIGUANIDE ON THE POSTPRANDIAL SYNDROME AFTER GASTRECTOMY WITH SPECIAL REFERENCE TO GLUCOSE TOLERANCE TEST AND INSULIN PRODUCTION. (E.)

Gyr, K. (Univ. Med. Clin., Basal, Switzerland), W. Berger, H. Göschke and G. A. Stalder. *Helv. Med. Acta* 35(6):521-530, 1969/70.

The effect of dimethyl-biguanide (DMB) on the postprandial symptoms in a group of symptomatic patients after gastrectomy was evaluated. With DMB all patients showed definitely lower 30, 45 and 60-min blood sugar values. In contrast, there were no characteristic changes in insulin values following DMB administration. Postprandial symptoms including dumping and late hypoglycemic symptoms were also markedly improved. The use of DMB is recommended, as there is no risk of hypoglycemia as with other therapeutic agents, such as insulin or tolbutamide. The improvement in glucose tolerance indicates that a therapeutic trial with this agent in gastrectomized patients with postprandial symptoms is worthwhile.

4774 THE EFFECT OF VAGOTOMY ON THE HISTAMINE CONTENT OF THE GASTROINTESTINAL TRACT. (E.) Reichle, F. A. (Temple U. Health Sci. Ctr., Philadelphia, Pa.), D. L. Newcomer, M. P. Brigham, R. M. Reichle, L. Labinsky and G. P. Rosemond. *Arch. Surg.* 103(2):133-139, 1971.

The effect of vagotomy on the histamine content of various portions of the gastrointestinal tract was studied. Rat jejunal histamine concentration was significantly lower after gastrectomy and vagotomy than after gastrectomy alone. It was also lower after pyloroplasty and vagotomy than after sham operation. Similar changes were observed in the histamine concentrations of duodenum in the experimental groups in which vagotomy was performed. Serotonin concentration was apparently not altered by vagotomy, but was altered (decreased) by loss of pyloric sphincter mechanism. Duodenal histamine concentration following pyloroplasty and vagotomy was significantly lower than after sham operation or after pyloroplasty alone. A lower average gastric histamine concentration was observed after gastrectomy and vagotomy than after gastrectomy alone, but the difference was not significant. These results do not support a role of histamine in decreased gastric acid secretion following vagotomy.

4775 POSTENTERECTOMY GASTRIC HYPERSECRETION IN DOGS: THE RELATIVE IMPORTANCE OF PROXIMAL VERSUS DISTAL RESECTION. (E.) Landor, J. H. (U. Florida Coll. Med., Gainesville), B. R. Behringer and R. A. Wild. *J. Surg. Res.* 11(5):238-242, 1971.

Mongrel dogs were initially prepared with Heidenhain pouches constructed from the greater curvature of the gastric corpus. After daily collection of gastric juice for 1 month, they were then subjected to either: simple division of the small intestine and end-to-end anastomosis followed 1 month later by retransection at the same site, removal of scar tissue and reanastomosis; resection of the proximal third of the small intestine followed after 1 month by resection of the middle third of the initial length of the entire intestine; initial resection of the distal third of the small intestine followed by the middle third. In the first group, there were no significant changes in gastric output after either procedure. In the second group, resection of the proximal third of the small intestine caused a significant increase in secretion in 4 of 5 dogs, while resection of the middle third caused a further significant increase in 3 of the surviving dogs. In the third group, resection of the distal intestine caused an observed but nonsignificant increase in secretion, while further resection of the middle third caused a further and significant increase. Finally, comparison of mean daily output showed significant increases in the latter 2 groups compared to controls.

4776 POSTOPERATIVE REFLUX ALKALI GASTRITIS AND ESOPHAGITIS. (E.) Mackman, S. (U. Wisconsin Med. Ctr., Madison), K. E. Lemmer and J. F. Morrissey. *Am. J. Surg.* 121(6):694-697, 1971.

Three patients with postoperative reflux alkali gastritis following partial gastrectomy and one with reflux alkali esophagitis having a hiatus hernia, vagotomy, and pyloroplasty are presented. In all 4 patients, the symptoms of pain, bilious vomiting and weight loss were relieved by Roux-Y anastomosis with the afferent loop entering the jejunum 35-40 cm distal to the gastroenterostomy. In these cases the diagnosis was confirmed by endoscopy which revealed bile-containing duodenal contents and ulceration, inflammation, and edema in the gastric pouch.

4777 ABO BLOOD GROUPS IN PATIENTS WITH GASTRIC CARCINOMA ASSOCIATED WITH PERNICIOUS ANAEMIA. (E.) Callender, S. (Gen. Hosp., Nottingham, England), M. J. S. Langman, I. N. Macleod, J. Mosbech and K. R. Nielsen. *Gut* 12(6):465-467, 1971.

The ABO blood groups of patients with pernicious anemia and gastric cancer (91) were compared with those of unselected patients with all forms of gastric cancer (4,211). No differences were found in the blood groups of those patients with pernicious anemia and the unselected group. Of the 53 patients with pernicious anemia and gastric cancer from the United Kingdom, 45.3% were of blood group A and 41.5% were of blood group O. Blood group seems to have a single effect associated with an underlying factor which predisposes to either disease.

4778 LYMPHOID HYPERPLASIA OF THE STOMACH PRESENTING AS UMBILICATED POLYPOID LESIONS. REPORT OF TWO CASES. (E.) Bahk, Y. W.

(Catholic Med. Coll., Seoul, Korea), J. S. Ahn and H. J. Choi. *Radiology* 100(2):277-280, 1971.

Two patients with benign lymphoid hyperplasia of the stomach which was manifested radiologically and gastroscopically by multiple small, umbilicated polypoid lesions are presented. In both cases the diagnosis was first suggested by an upper gastrointestinal series and was confirmed by subsequent gastrocamera and histological studies. Both patients presented with indigestion, sour eructation, anorexia, nausea, and weight loss. The lesions appeared as polyploid formations of the moderately prominent rugal folds, giving the gastric margin an undulated appearance.

4779 GASTRIC SECRETION IN PATIENTS WITH CARCINOMA OF THE CARDIA. (E.) Fischerman, K. (Finsen Inst., Copenhagen), P. Hyltoft Peterson, J. Bröckner, I. Neesgård and H. Pedersen. *Scand. J. Gastroenterol.* 6(3): 267-272, 1971.

Subjects consisted of 31 patients with carcinoma of the gastric cardia, 57 with other gastric carcinomas, and 40 with ulcer disease (15 of the gastric body, 12 prepyloric, 13 duodenal; all of these were acid secretors). Those with carcinoma of the cardia were significantly greater acid secretors than those with other gastric cancers, but did not differ significantly from those with ulcer disease. Serum pepsinogen levels less than 57 mU/liter were seen in less than 2.5% of ulcer patients, in 30% of all with gastric cancer, in 14% of those with carcinoma of the cardia and in 40% of those with gastric cancers at sites other than the cardia.

4780 DIARRHEA AFTER TOTAL AND SELECTIVE VAGOTOMY. (E.) George, J. D. (Norwich Gen. Hosp., Norfolk, England) and J. Magowan. *Am. J. Dig. Dis.* 16(7):635-640, 1971.

The effect of vagotomy on gastric emptying and the development of diarrhea was studied in 42 patients with diarrhea 1 yr after surgery and 28 who were symptom free at that time. Following either total vagotomy and pyloroplasty (12 patients), selective vagotomy and pyloroplasty (6 patients) or total vagotomy and gastrojejunostomy (6 patients) the rate of emptying was significantly faster than before surgery. The rate of gastric emptying was significantly faster in patients with diarrhea after total vagotomy and pyloroplasty, total vagotomy and gastrojejunostomy, and selective vagotomy and pyloroplasty, than in those who were symptom free.

4781 MORPHOLOGIC AND HISTOCHEMICAL DEMONSTRATION OF PROTEIN IN GASTRIC SURFACE EPITHELIUM IN PROTEIN-LOSING GASTROPATHIES. (E.) Lev, R. (New York Med. Coll., N. Y.) and I. Brus. *Am. J. Dig. Dis.* 16(7):589-598, 1971.

Gastric mucosa from patients with acute hemorrhagic gastritis, Menetrier's disease, gastric carcinoma, gastric polyp and chronic atrophic gastritis was studied morphologically and histochemically to determine the extent and identity of the eosinophilic bodies observed in damaged gastric surface epithelium in various gastropathies. The bodies were numerous within the distal fundic epithelium of patients with acute hemorrhagic gastritis and in cases of carcinoma and polyps were found in the mucosa adjacent to the neoplasm rather than in the tumor tissue. Histochemical findings indicated the presence of only plasma proteins and hemoglobin within the droplets, however, definitive identification was not possible. These protein bodies within the surface epithelium may represent the morphologic counterpart of the protein loss described clinically in various gastropathies. Another type of droplet which was found in epithelium overlying severely edematous stroma may represent another route by which protein escapes into the lumen.

4782 PERFORATED GASTRIC DUPLICATION WITH PULMONARY COMMUNICATION: A CASE REPORT. (E.) Shochat, S. J. (Harvard Med. Sch., Boston, Mass.), R. D. Strand, K. E. Fellows and J. Folkman. *Surgery* 70(3):370-374, 1971.

4783 MENDELSON'S SYNDROME OR PULMONARY ASPIRATION OF GASTRIC ACID. (A REVIEW). (It.) Baronti, A. (INPS E. Morelli Hosp., Sondalo, Italy) and G. Sevieri. *Ann. Med. Sondalo* 18(2):67-75, 1970.

4784 INFLAMMATORY FIBROID POLYP OF THE STOMACH. (EOSINOPHILIC GRANULOMA). (Dut.) Tanghe, W. (H. Hart Clin., Roeselare, Belgium), A. Lauweryns and R. Maenhoudt. *Tijdschr. Geneeskd.* 27(6):269-273, 1971.

4785 GASTRIC MUCOSAL DIAPHRAGM IN A CHILD. (E.) Johnson, G. M. (Missouri Valley Clin., Bismarck, N. D.). *Pediatrics* 47(5): 916-919, 1971.

4786 COARSE DUODENAL MUCOSAL FOLDS IN PATIENTS WITH DYSPEPSIA AND A HIGH GASTRIC ACID OUTPUT. (E.) Fraser, G. M. (Falkirk Dis. Roy. Infirm., England), P. S. MacFarlane and R. G. Main. *Clin. Radiol.* 22(1): 78-82, 1971.

4787 IMPROVED TECHNICS USING THE BOWEL STAPLING CLAMPS IN NINETEEN CONSECUTIVE GASTRIC RESECTIONS. (E.) Dickman, R. W. *Am. J. Surg.* 121(5):628-630, 1971.

4788 EFFECTS OF CENTRAL NEUROTROPIC DRUGS ON CINCHOPHEN-INDUCED GASTRIC LESIONS IN RATS. (Jap.) Hirai, Y. (Gunma U. Sch. Med., Maebashi, Japan). *Kitakanto Med. J.* 20(2):76-84, 1970.

4789 PATHOGENESIS OF AGASTRIC ASTHENIA. (Rus.) Koialo, I. K. *Zdravookhr. Beloruss.* 17(2):17-20, 1971.

4790 SIMULATION OF CONGENITAL PYLORIC ATRESIA BY LIGAMENTUM TERES HEPATIS FREELY TRANSVERSING THE PERITONEAL CAVITY AND OBSTRUCTING THE OUTLET OF THE STOMACH. (Ger.) Vinz, H. (Med. Acad. Surg. Clin., Magdeburg, Germany). *Z. Kinderchir.* 9(3/4):432-434, 1971.

4791 DRAINAGE OF DUODENUM AND EFFERENT LOOP IN GASTRIC OPERATIONS. (Pol.) Zalewski, J. (Med Acad 2nd Surg. Clin., Bialystok, Poland), A. Klepacki and A. Nazarkiewicz. *Wiad. Lek.* 24(3):193-198, 1971.

4792 THE MALLORY-WEISS SYNDROME. (Rus.) Patsiora, M. D., K. N. Tsatsanidi and A. K. Eramishantsev. *Vestn. Khir.* 106(2):139-140, 1971.

4793 GASTROINTESTINAL AMYLOIDOSIS SIMULATING CARCINOMA OF THE STOMACH. (Dan.) Albrechtsen, R. (Cent. Hosp., Nykobing Falster, Denmark) and A. Nielsen. *Ugeskr. Laeger* 133(11): 506-507, 1971.

4794 SURGICAL TREATMENT OF REGIONAL ENTERITIS OF THE STOMACH AND DUODENUM. (E.) Burgess, J. N. (U. Minnesota Mayo Grad. Sch. Med., Rochester), D. A. Legge and E. S. Judd. *Surg. Gynecol. Obstet.* 132(4):628-630, 1971.

4795 A CASE OF TUMOR-LIKE GASTRITIS ASSOCIATED WITH GASTRIC ULCER. (Pol.) Gladysz, A. (Med. Acad. Dept. Infect. Dis., Wroclaw, Poland), J. Gajewski and T. Mielecki. *Pol. Tyg. Lek.* 26(1):22-23, 1971.

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4797 SELECTIVE PREVENTIVE DRAINAGE AND PYLORECTOMY. (Hun.) Aranyi, S., S. Fontanyi and E. Csorba. *Orv. Hetil.* 112(1): 34-35, 1971.

4798 GASTRIC OUTLET OBSTRUCTION AFTER VAGOTOMY. (E.) Smith, R. S. (St. Luke's Hosp., Boise, Idaho). *Northwest Med.* 70(1):36-40, 1971.

4799 THE PALLIATIVE OPERATIONS AND RE-OPERATIONS FOR RECURRENCE IN THE SURGICAL THERAPY OF CANCER OF THE STOMACH. (It.) Mazzeo, F., M. L. Santangelo and A. Agresti. *Minerva Med.* 62(6):257-260, 1971.

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4803 FATAL SALT POISONING DUE TO GASTRIC LAVAGE WITH HYPERTONIC SALINE. (E.) Carter, R. F. (Child. Hosp., Adelaide, Australia) and B. J. Fotheringham. *Med. J. Aust.* 1(10): 539-541, 1971.

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4816 CHRONIC INFLUENCE OF AN ACETYLCHOLINESTERASE INHIBITOR ON THE CLINICAL DISTURBANCES AND ON THE POST HISTAMINE GASTRIC SECRETION OF HYPOCHLORHYDRIC PATIENTS. (Fr.) Ligny, G. (Civil Hosp., Charleroi, Belgium) and J. Manouiloff. *Bull. Soc. Clin. Hop. Charleroi* 22(1):9-13, 1971.

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4818 ARTERIOGRAPHIC MANIFESTATIONS OF TUBERCULOSIS OF THE SPLENIC FLEXURE AND THE STOMACH. (E.) Kinkhabwala, M. (State U. New York Downstate Med. Ctr., Brooklyn) and R. Dziadiw. *Br. J. Radiol.* 44(521):384-387, 1971.

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4824 TRAUMATIC RUPTURE OF THE STOMACH. A CLINICAL AND STATISTICAL STUDY. (It.) Pavanello, P. M. (Infermi Hosp., Faenza, Italy) and R. Montevecchi. *Clinica (Bologna)* 30(1): 32-40, 1970.

4825 THE INDICATIONS AND LIMITATIONS OF VAGOTOMY IN THE CONSERVATIVE TREATMENT OF UPPER GASTROINTESTINAL HEMORRHAGES. (Rum.) Petrescu, C. (Munical, Emergency Hosp., Bucharest), G. Ionescu and M. Lucan. *Chirurgia (Bucur.)* 19(12):1093-1104, 1970.

4826 GASTRIC EROSIONS. (Ger.) Rosch, W. (Univ. Med. Clin., Erlangen-Nuremberg, Germany) and R. Ottenjann. *Med. Klin.* 65(46): 2018-2020, 1970.

4827 VOLVULUS OF THE STOMACH. (Bul.) Opanov, B. and S. Dimitrov. *Khirurgiia (Sofiia)* 23(6):592-594, 1970.

828 THE SIGNIFICANCE OF CERTAIN EXOGENOUS AMINO ACIDS IN INFANTS WITH CONGENITAL YPERTROPHIC PYLORIC STENOSIS. (Pol.) aciejewski, A. (Med. Acad. Pediatr. Surg. Clin., odz, Poland) and H. Bobinski. *Pediatr. Pol.* 5(10):1165-1170, 1970.

829 THE JEZIORO MODIFICATION OF THE HELLER GROENEWELDT TECHNIQUE. GASTRIC WALL RAFT FOR MYOCARDIOPLASTY. (Pol.) Jezioro, Z. Med. Acad. 3rd Surg. Clin., Wroclaw, Poland), M. ernat and Z. Zimmer. *Pol. Przegl. Chir.* 2(11):1695-1702, 1970.

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831 A PERSONAL METHOD OF CLOSURE OF THE DUODENAL STUMP AFTER GASTRECTOMY. Pol.) Heftman, W. R. (Med. Acad. 2nd Surg. lin., Stettin, Poland). *Pol. Przegl. Chir.* 2(11):1686-1689, 1970.

832 SURGICAL SUTURES OF THE STOMACH AND INTESTINES. (Pol.) Piskorz, A. (Med. cad. 1st Surg. Clin., Poznan, Poland). *Pol. rzegl. Chir.* 42(11):1682-1685, 1970.

833 SURGICAL TREATMENT OF CARDIOSPASM RECURRING AFTER OPERATION ACCORDING TO ELLER GROENEWELDT AND SWEET. (Pol.) Jezioro, . (Med. Acad. 3rd. Surg. Clin., Wroclaw, Poland), . Bernat and J. Sapota. *Pol. Przegl. Chir.* 2(11):1667-1674, 1970.

834 INTRAVENOUS LOADING WITH ISOTONIC SODIUM CHLORIDE SOLUTION IN PATIENTS ITH GASTRIC CARCINOMA OR ULCER: INFLUENCE OF OADING ON THE VOLUME OF CIRCULATING BLOOD AND HE LEVEL OF BLOOD SERUM PROTEINS. (Pol.) arczynska, A. (Med. Acad. 2nd Surg. Clin., racow, Poland), B. Adamczyk, J. Cieckiewicz and . Oszacki. *Pol. Przegl. Chir.* 42(11):1653-1659, 970.

4835 PYLORIC OBSTRUCTION BY A TRICHOBEZOAR IN A MALE PATIENT. (Pol.) Rzepecki, A. (Med. Acad. 3rd Surg. Clin., Gdansk, Poland) and A. Kreglewski. *Pol. Przegl. Chir.* 42(12): 1858-1859, 1970.

4836 SOME OBSERVATIONS ON INTRACTABLE GASTRIC ULCER. (Jap.) Miyashita, Y. (Miyashita Hosp., Ueda City, Nagano, Japan). *Stomach Intest. (Tokyo)* 5(13):1683-1688, 1970.

4837 TWO CASES OF BENIGN TUMOR OF THE CARDIA. (Fr.) Hivet, M. (Alma Surg. Ctr., Paris), J. Guillard and P. Martin. *Sem. Hop. Paris* 46(41):2579-2583, 1970.

4838 MALLORY-WEISS SYNDROME. (Ger.) Witte, S. (Deaconess Hosp., Karlsruhe, Germany) and D. Göbel. *Dtsch. Med. Wochenschr.* 96(29):1214-1217, 1971.

4839 FATAL RECURRENCE OF GASTRIC ADENOCARCINOMA 11 AND 13 YEARS AFTER INCOMPLETE RESECTION. (E.) Harmon, J. (Boston City Hosp., Mass.) and B. Cady. *Lahey Clin. Found. Bull.* 20(3):108-113, 1971.

4840 ENDOSCOPIC BIOPSY DIAGNOSIS OF GASTRIC POLYPS. (Ger.) Rosch, W. (Univ. Med. Clin., Erlangen-Nuremberg, Germany), K. Elster and R. Ottenjann. *Dtsch. Med. Wochenschr.* 96(1):39-40, 1971.

4841 ULCER-LIKE CANCER OF THE STOMACH. (Fr.) Caron, J. (CHU, Angers, France) and C. Caron Poitreau. *Concours Med.* 93(9): 1508-1513, 1971.

4842 GASTRIC ANALYSIS. (E.) Rovelstad, R. A., F. T. Maher and M. A. Adson. *Surg. Clin. North Am.* 51(4):969-978, 1971.

4843 CALORIMETRY IN PARTIAL AND TOTAL RESECTIONS OF THE STOMACH: RESULTS. (Ger.) Fischer, R. (Stuttgart-Bad Cannstatt Hosp., Germany) and H. U. Benz. *Z. Gastroenterol.* 9(4):266-276, 1971.

See also numbers: 4696, 4705, 4713, 4716, 4718, 4832, 5166, 5319

4844 THE STRESS ULCER SYNDROME. A CLINICAL AND PATHOLOGIC REVIEW. (E.) Crawford, F. A., J. W. Hammon, Jr. and W. W. Shingleton (Duke U. Med. Ctr., Durham, N. C.). *Am. J. Surg.* 121(6):644-649, 1971.

One hundred and sixty cases of "acute" ulcers of the stomach and/or duodenum found at autopsy over a 13-yr period and 43 cases of clinically-treated stress ulcers were reviewed. In both groups, there was a slightly greater than 2:1 male predominance, and steroids were used in treating more than 30% of all patients. Fifty six percent of the patients with stress ulcers at autopsy were undiagnosed prior to death, 18.5% were untreated, 22.8% had conservative treatment, and 2.5% had surgical treatment. More than 60% of the ulcers in this series were gastric in location; however, a high rate of duodenal perforation was observed. In the clinical series, the mortality rates were 7% in those receiving no therapy, 76% in those treated conservatively, and 53% in patients treated conservatively and with surgery. Vagotomy and partial gastric resection was the most successful surgical procedure employed.

4845 A TRIAL OF DEGLYCYRRHIZINATED LIQUORICE IN THE TREATMENT OF DUODENAL ULCER. (E.) Feldman, H. (Tel-Aviv U. Med. Sch., Israel) and T. Gilat. *Gut* 12(6):449-451, 1971.

The effect of deglycyrrhizinated liquorice in the treatment of duodenal ulcer was investigated in 47 patients using a double-blind technique. There were no significant differences between the group receiving placebo (24) and the group treated with liquorice (23) regarding nocturnal pain, heartburn and nausea. There were no side effects attributable to treatment and, in particular, no fluid retention and no effects on blood pressure and electrolytes. Laboratory examinations remained normal throughout the study, whereas constipation was improved during treatment in both groups. Deglycyrrhizinated liquorice seemingly has no advantage over placebo in the treatment of duodenal ulcer.

4846 STUDIES ON BILLROTH I GASTRECTOMY. A. BLOOD GLUCOSE CURVES IN THE LATE POSTOPERATIVE PERIOD. (Por.) Moisão, R. (Lisbon Sch. Med., Portugal). *J. Soc. Cienc. Med. Lisboa* 135(3):267-288, 1971.

Glucose tolerance tests, performed on 80 patients who had undergone classical Billroth I gastroenterostomies some time before for peptic ulcer and who had no evidence of dumping syndrome, were within normal limits, indicating that these patients absorb glucose normally. These findings agreed with the results of radiological examinations which showed that most patients had a pseudosphincter that assumed the morphological features of the duodenal bulb and facilitated rhythmic emptying of the stomach. Blood glucose levels increased and decreased abruptly and stomach emptying was very rapid in a patient who developed dumping syndrome after undergoing Shoemaker's modification of the Billroth I operation, suggesting that nerves are transected near the anastomosis when the lesser curvature is resected. In another patient dumping disappeared and blood glucose curves and stomach emptying normalized after conversion of a Polya gastroenterostomy into a Billroth I gastroduodenostomy.

4847 THE LONG-TERM METABOLIC CONSEQUENCES OF PARTIAL GASTRECTOMY. (E.) Pryor, J. P. (King's Coll. Hosp., London), M. J. O'Shea, P. L. Brooks and G. K. Datar. *Am. J. Med.* 51(1):5-10, 1971.

The long-term metabolic consequences of partial gastrectomy were studied in 187 patients who underwent surgery for chronic peptic ulceration. The mean weight change for all patients was a gain of 2% of the preoperative weight although 20% of the patients lost more than 5% of their preoperative weights. Hematologic studies revealed that 82 patients (44%) were anemic while only 17 (9%) had hemoglobin levels less than 10 mg/100 ml of blood. Vitamin B_{12} deficiency occurred in 14 (7.5%) of the patients investigated, and all but one had a coexisting iron deficiency. No evidence of folate deficiency was found in the whole series. There were 6 cases of osteomalacia, 18 patients with hypocalcemia (serum calcium <8.5 mg/100 ml), 18 patients with elevated serum alkaline phosphatase levels and 16 patients had osteoporosis. The limited amount of stomach removed in these patients may account for the low incidence of metabolic deficiencies.

4848 PEPTIC ULCERS IN ADOLESCENTS: ETIOLOGICAL AND CLINICAL STUDY OF 100,000 YOUNG ADULTS. (Fr.) Beccuau, M., A. Boudet, J.-N. Rouvier, F. Bressac, D. Weimann, H. Ille, J. Freyria, H. Felix and C. Laverdant (Army Teaching Hosp., Saint-Mande, France). *Lyon Med.* 225(8):715-722, 1971.

Peptic ulcers were diagnosed in 147 (1.56%) of 93,832 young Frenchman, aged 18-20 yr. These included 132 subjects with duodenal ulcers, 14 with stomach ulcers, and only 1 with both stomach and duodenal ulcers. Most of the ulcers (111) developed at age 17 or later. Although no difference was found in the prevalence of peptic ulcer in residents of the Paris region and in those of the Rhone-Alps region, 106 came from urban areas and only 41 from rural areas. Compared to the general population, students were over-represented among hese subjects. Family histories of peptic ulcer ere obtained in 55 (37.5%) of the subjects with lcers; 29 had undergone appendectomies and 18 . ad a history of viral hepatitis. It is estimated hat 23% of these subjects ate irregularly and id not eat balanced diets. Onset of the ulcer as closely associated with allergies in 7, ranial trauma in 4, and ingestion of large mounts of aspirin in 1 case. Minor psychiatric r personality disorders characterized by anxiety nd irritability were present in 47 (32%). ymptoms were atypical in 71 subjects (48.2%), nd the onset was manifested by complications in 0: bleeding in 9 subjects and perforation in 1. asal and histamine-stimulated gastric acid ecretion was significantly higher among subjects ith duodenal ulcers than among normal controls. study of the relation between gastric acid and epsin secretion in 5 subjects, after both histamine and pentagastrin stimulation, suggests that he hormone factor is more significant than the agal factor in the etiology of peptic ulcer in dolescents.

849 CHOLINERGIC ACTIVITY OF THE BLOOD AND CHANGES IN IT IN PATIENTS WITH PEPTIC LCER. (Rus.) Bondar', Z. A. (1st Moscow Med. nst.), R. A. Sokolinskaia and N. K. Smirnova. *er. Arkh.* 43(4):16-22, 1971.

lood levels of free and total acetylcholine (isolated guinea pig muscle assay) were higher nd bound acetylcholine was lower than normal in atients with duodenal ulcer, stomach ulcer, and uodenal and stomach ulcer exacerbations. *In itro* binding of acetylcholine was increased in atients with mild forms of peptic ulcer, but was omewhat decreased in those with chronic and evere forms. Blood acetylcholinesterase activities were within normal limits in both groups. uring remissions the rate of enzymatic acetylholine hydrolysis increased and most of the arameters studied tended to return to normal, articularly in patients with mild peptic ulcers.

850 COMBINED ULCEROGENIC EFFECT OF EMOTIONAL STRESS AND CAFFINE OR COFFEE IN ANIMAL XPERIMENTS. (Ger.) Evert, G. (Med. Acad. 1st ed. Clin., Lubeck, Germany), F. Niedobitek and . Schmid. *Z. Gastroenterol.* 9(2):94-100, 1971.

eroral (tube) administration of coffee infusions r 0.09% caffeine solutions to immobilized male istar rats increased the incidence of stomach lcers by 21-14%. The dose of caffeine administered was equivalent to that of 2-3 cups of coffee n man. The incidence of ulcers was essentially he same in controls and in rats given caffeineree coffee or coffee with low contents of affeine and chlorogenic acid.

851 UROGASTRONE THERAPY FOR PATIENTS WITH PEPTIC ULCER. (It.) Babando, G. M. (Umberto I Mauriziano Hosp., Turin, Italy). *Minerva Gastroenterol.* 16(4):174-180, 1970.

A preparation containing urogastrone, dihydroxyaluminum aminoacetate, and belladonna extract (8 tablets/day) was used to treat 30 patients with duodenal ulcer (17), stomach ulcer (2), gastritis (3), duodenitis (4), gastroduodenitis (1), perivisceritis (1), inflammation of a gastric anastomosis (1), and a suspected neoplasm in a gastric anastomosis (1). All but 3 patients responded to therapy. Results of a 6-month follow-up show that total acidity was reduced by 33%, body weights increased, radiological improvement occurred in 13 of 29 patients, and pain was alleviated in 28 patients. Gastroscopic findings improved in 5 of 6 patients examined. Side effects were mild and included constipation, dryness of the throat, and somnolence.

4852 EXPERIMENTAL GASTRODUODENAL ULCER. (E.) Vojtíšek, V. (Surg. Clin. Fac. Med. Hyg., Prague), V. Jelínek and A. Chlumská. *Am. J. Surg.* 121(6):650-655, 1971.

The effect of intramural, intramucosal and transventricular (in stomach lumen) injections of artificial gastric juice on the gastric mucosa was studied in dogs. Intramucosal injection of 5 ml of artificial gastric juice was consistently followed by deep callous ulcers on the lesser and greater curvatures of the stomach. The observed defects were indistinguishable from human ulcers when compared grossly and microscopically. When dilute hydrochloric acid without pepsin was administered, the ulcers were considerably smaller. Inflammation and occasionally hemorrhage and necrosis were observed in the regional lymph nodes. The efficacy of antiulcer drugs seemingly could be easily tested in this model of callous peptic ulcer which seems to be closely related to, if not identical with, human peptic ulcer.

4853 CHANGES IN METABOLIC AND ENDOCRINE PARAMETERS IN THE BLOOD AND URINE IN EXPERIMENTAL DUODENAL AND STOMACH ULCERS. (Rus.) Kosenko, A. F. (Kiev Med. Inst., USSR) and V. E. Kushnir. *Vrach. Delo* (2):89-93, 1971.

Plexiglas rods and spheres, implanted in the tuber cinereum in 4 dogs with gastric fistulas, caused basal gastric hypersecretion and hyperacidity. At autopsy all dogs had bleeding, erosions, and ulcers in the stomach and duodenum; 1 dog died of a perforated duodenal ulcer. After surgery urinary excretion of 17-hydroxycorticosteroids increased in all 4 dogs. Contrary to expectations, catecholamine excretion was not increased; epinephrine excretion even decreased in 1 dog. If catecholamine oxidation was increased, it was not caused by increases in ceruloplasmin; ceruloplasmin levels were decreased in all 4 dogs. Trophic lesions found in the stomach and duodenum of these dogs are attributed to increases in the activity of the hypothalamo-pituitary-adrenal system, increased stimulation and decreased reactivity of the sympathoadrenal system, and unbalanced hyperreactivity of the parasympathetic nervous system.

4854 EFFECT OF A MIXED BREAKFAST ON DUMPING IN GASTRECTOMIZED PATIENTS. (Rus.) Rymarenko, T. V. (Inst. Nutr., Moscow), I. S. Savoshchenko and T. I. Loranskaia. *Vopr. Pitan.* 30(1):78-81, 1971.

Blood acetylcholine levels, assayed in guinea pigs, were increased in 18 and acetylcholinesterase activities were slightly increased in 14 of 20 fasting patients who had been gastrectomized because of duodenal or stomach ulcers. Within 15-20 min after ingestion of a breakfast consisting of meat, cereal, lettuce, and tea with sugar, when symptoms of dumping were most pronounced, blood acetylcholinesterase doubled in 14 patients and blood acetylcholine levels increased. In 5 of these 20 patients, however, almost no clinical symptoms of dumping were observed when blood acetylcholine and acetylcholinesterase increased. In other patients the extent of changes in these parameters paralleled the severity of symptoms. By 2-2.5 hr after ingestion of the meal, blood acetylcholine and acetylcholinesterase returned to their initial levels or decreased still further. These findings indicate that the parasympathetic nervous system is involved in dumping syndrome.

4855 ULCERS IN THE GASTRIC NOTCH. RADIOLOGICAL ILLUSTRATION OF THE CONFORMITY OF MORPHOLOGY AND FUNCTION. (Ger.) Eschbach, H. (Stralsund Dist. Hosp., Germany). *Radiol. Diagn. (Berl.)* 11(6):697-705, 1970.

Of all patients with stomach ulcers seen in a 20-yr period, 10.2-13.5% had ulcers located in the gastric notch (incisura angularis ventriculi). Almost all of these 100 patients were men and ranged from 27-59-yr old (mean age 42 yr). Radiological evidence of healing was observed in 92% of patients with acute ulcers and in 33% of patients with chronic ulcers of the gastric notch; most of the latter group had recurrences and eventually had to undergo surgery.

4856 LEVEL OF GROWTH HORMONE IN SERUM FROM PEPTIC ULCER PATIENTS. (Rus.) Mosin, V. I. (Stavropol Med. Inst., USSR). *Vrach. Delo* (2):93-94, 1971.

By measuring inhibition of passive hemagglutination, levels of growth hormone in serum from 30 peptic ulcer patients (18 with duodenal ulcers and 12 with stomach ulcers) were found to range from 3-96 μ g/100 ml. Growth hormone levels were increased (27-96 μg/100 ml) in 19 patients and were normal (3-24 μg/100 ml) in 11. Mean values for ulcer patients were significantly higher than the mean for 11 normal controls. Gastric acid secretion and basal and histamine-stimulated pepsin secretion were higher in patients with high levels of growth hormone than in those with low levels. These findings indicate that in some patients with peptic ulcer the functional activity of the anterior pituitary is increased to compensate for the negative protein balance in peptic ulcer. This increased pituitary activity causes increased production of acid and pepsin by the gastric mucosa.

4857 ACUTE STRESS ULCERATION WITH BLEEDING OR PERFORATION. (E.) Girvan, D. P. and R. B. Passi (Victoria Hosp., London, Ontario, Canada). *Arch. Surg.* 103(2):116-121, 1971.

A total of 980 patients presenting with upper gastrointestinal tract bleeding or perforation were reviewed over a 10-yr period (1958-1968). Thirty patients were considered to have acute stress ulceration as proved at operation or autopsy. Of these 30 patients, 15 had acute stress ulceration in the duodenum ahd 15 in the stomach. Single ulcers were more common in the duodenum, whereas multiple ulcers were more common in the stomach. Sepsis confirmed by bacteriological growth with clinical evidence of infection was present in 12 of 30 cases and was thought to be an important factor in the pathogenesis. Eleven patients were treated operatively and had a survival of 64%, while only 1 of 19 patients not treated surgically survived. Vagotomy and gastrectomy was advocated for bleeding acute stress ulceration and an omental patch for perforation. Early operative management is recommended to improve survival of this serious condition.

4858 GASTRIC MUCOSAL CHANGES FOLLOWING BURNS IN RATS. A MORPHOLOGICAL AND METABOLIC APPROACH TO THE STRESS ULCER PROBLEM. (E.) Chiu, C.-J. (Montreal Gen. Hosp., Quebec, Canada), A. H. McArdle, R. A. Brown, H. J. Scott and F. N. Gurd. *Arch. Surg.* 103(2): 147-152, 1971.

Following 40% body surface scald and subsequent 24-hr fasting, albino rats demonstrated a decrease in the gastric mucosal ATP, while their DNA content was unchanged. Also in scalded rats, the oxygen consumption of the mucosal scrape as determined in vitro was reduced to 68% of the control. Following scalding, grossly diffuse congestion of the mucosa and areas of mucosal hemorrhage were noted in the gastric mucosa. Positive acid-Schiff positive mucus over and inside the epithelial cells was markedly reduced. Many superficial erosions, but no deep penetrating ulceration, were found in the mucosa. In other species, (dog, pig, human) as well as rats, the loss of surface epithelium appeared to precede the development of deeper mucosal necrosis and ulceration. Separation of the cells, often as a strip, subsequent to the development of a space at the infranuclear portion was observed. Such changes taking place in the mucosal cells, which represent the gastric barrier against the hostile intraluminal content, are perhaps an important process in the pathogenesis of gastric stress ulcer.

4859 VAGOTOMY LIMITED TO THE PARIETAL CELL MASS. PRELIMINARY PATIENT STUDIES. (E.) Miller, B., C. T. Bombeck (U. Illinois Abraham Lincoln Sch. Med., Chicago), W. Schumer, R. E. Condon and L. M. Nyhus. *Arch. Surg.* 103(2):153-157, 1971.

Parietal cell vagotomy was evaluated in a pilot study of the procedure and its effects on acid secretion, ulcer symptoms, and postvagotomy diarrhea were studied. In 25 patients who received the procedure and were followed from 8 months to 2.5 yr, the basal acid secretory rate was reduced from 6.88 to 4.20 mEq/hr. The average histamine-stimulated acid secretory rate was decreased from 28.00 to 13.36 mEq/hr in the postoperative period. All patients were relieved of duodenal ulcer symptoms and no patient developed diarrhea or any other symptoms of the postvagotomy syndrome. The 50% reduction of histamine-stimulated acid secretion following parietal cell vagotomy compares favorably with results of other authors both for parietal cell vagotomy, and for other standard ulcer procedures.

4860 GASTROJEJUNOSTOMY. AN UNSATISFACTORY DRAINAGE PROCEDURE FOR VAGOTOMY. (E.) Griffen, W. O., Jr. (U. Kentucky Med. Ctr., Lexington), J. D. Richardson and R. Bolick. *Arch. Surg.* 103(2):140-146, 1971.

Seven of 10 patients with duodenal ulcer who underwent vagotomy and gastroenterostomy had strong evidence of recurrent ulcer disease 8 yr postoperatively. This unusually high recurrence rate in these patients stimulated a review of reported results of vagotomy and gastroenterostomy compared to those of vagotomy and pyloroplasty. A 3.8% recurrence rate was seen in 1,657 patients who had a pyloroplasty, while a 9.6% recurrent ulcer occurred in 2,508 patients undergoing a gastroenterostomy as a drainage procedure. Greater patient dissatisfaction and more late complications following gastroenterostomy were found. In one study, diarrhea and difficulty of bilious vomiting or regurgitation were twice as common in patients 5 yr following gastrojejunostomy as in patients after pyloroplasty. Moreover, the fashioning of either an antecolic or retrocolic gastrojejunostomy always has the potential hazard of the development of afferent loop syndrome. A single advantage for gastroenterostomy, namely, the avoidance of dissection in the area of maximum scarring, may be obviated by a side-to-side gastroduodenostomy which possesses all of the physiologic advantages of a pyloroplasty.

4861 TREATMENT OF ULCERS WITH ANTIBIOTICS. PERSONAL EXPERIENCE. (Sp.) Zaragoza Garcia, P. (Alcoy, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(4):435-450, 1971.

Of 257 patients with peptic ulcer, 85 (32%) developed episodes of pain within 1 yr after infections (dental caries, abscesses, sinusitis, tonsillitis, rheumatic diseases, and recurrent upper respiratory infections). Ulcers and infections were definitely related in 45 patients (17%). In other patients pain, with or without bleeding, was associated with butazolidone (15), aspirin (17), sulfamides (4), amphetamine (2), reserpine (1), and corticosteroids (2). Treatment consisted of diet therapy, anticholinergic agents, and tetracycline (250 mg 4 times/day for 1 week); patients with obvious foci of infection also received penicillin (400,000 U/day i.m. for 1 week). Pain disappeared during the first 3 days of treatment in 229 patients (89%), and 174 patients (65%) gained weight. Only 7 patients had to undergo surgery: 3 who failed to respond to treatment and 4 who were suspected of having stomach cancer; 3 other patients elected surgery.

4862 HISTOCHEMICAL AND ULTRASTRUCTURAL STUDY OF SCAR FORMATION IN RESTRAINT-INDUCED ULCERS IN RATS. (Fr.) Lehy, T. (Bichat Hosp., Paris), P. Zeitoun, M. Dubrasquet and S. Bonfils. *Arch. Fr. Mal. App. Dig.* 59(10-11, Suppl. 2):107-124, 1970.

Ulcers induced in Wistar rats by restraining them for 24 hr consisted of areas of necrosis which occasionally reached the muscularis mucosae but rarely involved the submucosa and never affected cells in the adjacent mucosa; marked vascular changes did occur in the area around the lesion. During active scar formation necrotic exfoliation occurred and, after about 3 days, epithelial regeneration began. In the area immediately surrounding the ulcer the number and activity of parietal cells initially decreased, and chief cells lost their zymogen granules. After 2 days the epithelial crypts became enlarged and mucus hypersecretion became evident. In addition to the normal components of mucus, sulfated glycoproteins were secreted by these crypts and by morphologically normal areas of the fundal mucosa further away from the ulcer. Ultrastructural changes in secretion granules accompanied these histochemical changes and reached a maximum after 2-4 days. In the hyperplastic neck of fundal glands transitional stages between mucus-secreting cells and chief cells were found.

4863 GASTRODUODENAL ULCER. (Fr.) Paolaggi, J. A. (Bichat Hosp., Paris) and E. Pappo. *Gaz. Med. Fr.* 78(18):2855-2862, 1971.

4864 DEVELOPMENT OF STRESS ULCER IN RATS AND GUINEA PIGS BY MECHANICAL ROTATION. (E.) Hase, T. (Walter Reed Army Med. Ctr., Washington, D. C.) and E. S. Scarborough. *J. Appl. Physiol.* 30(4):580-582, 1971.

4865 GASTRECTOMY AND GASTRODUODENAL ANASTOMOSIS FOR POST BULBAR ULCERS AND PEPTIC ULCERS OF THE SECOND PART OF THE DUODENUM. (Fr.) Dubois, F. (Univ. Hosp., Paris). *J. Chir. (Paris)* 101(2):177-186, 1971.

4866 THE MAJOR COMPLICATIONS OF GASTRODUODENAL ULCERS. (Fr.) Girard, M. *J. Med. Lyon* 52(1201):125-134, 1971.

4867 THE IMMUNOBIOLOGICAL REACTIVITY IN PATIENTS WITH PEPTIC ULCER AFTER AUTOHEMOTRANSFUSION. (Rus.) Sokol, B. G. *Khirurgiia (Mosk.)* 47(1):123-125, 1971.

4868 THE PROBLEM OF ACUTE GASTRIC HEMORRHAGES IN ULCERS. (Rus.) Bratus, V. D. *Klin. Khir.* 51(2):1-6, 1971.

4869 BASIC PROBLEMS OF SURGICAL TREATMENT OF COMPLICATED FORMS OF ULCER. (Rus.) Kalchenko, I. I. and F. P. Nechiporenko. *Klin. Khir.* 51(2):7-13, 1971.

4870 ACTUAL PROBLEMS OF SURGICAL TREATMENT OF PATIENTS WITH COMPLICATED FORMS OF GASTRODUODENAL ULCERS. (Rus.) Kovaliov, M. M. *Klin. Khir.* 51(2):14-19, 1971.

4871 NEUROHUMORAL AND MORPHOLOGICAL ASPECTS OF VAGOTOMY IN REPEATED OPERATIONS FOR ULCER. (Rus.) Komorovskii, I. T., M. M. Ishchenko and M. T. Gerasimets. *Klin. Khir.* 51(2):19-24, 1971.

4872 ORGAN CONSERVATION IN THE SURGICAL TREATMENT OF ULCER. (Rus.) Fuks, B. I., E. M. Perkin and V. I. Kozlov. *Klin. Khir.* 51(2):24-27, 1971.

4873 BIOCHEMICAL INDICES OF THE BLOOD DURING AUTOHEMOTRANSFUSION IN PATIENTS OPERATED FOR ULCER AND CHRONIC CHOLECYSTITIS. (Rus.) Sokol, B. G. *Klin. Khir.* 51(2):28-30, 1971.

4874 AN INTENSIFIED HISTAMINE TEST IN DISEASES OF THE STOMACH. (Rus.) Beno, I. *Klin. Med. (Mosk.)* 49(2):21-25, 1971.

4875 TREATMENT OF UNCOMPLICATED PEPTIC ULCER DISEASE. (E.) Schiff, E. R. (U. Miami Sch. Med., Fla.). *Med. Clin. North Am.* 55(2):305-315, 1971.

4876 DOUBLE BLIND STUDIES OF GASTRIC ULCER TREATMENT WITH CARBENOXOLONE SODIUM. (Ger.) Rosch, W. (Univ. Med. Clin., Erlangen/Nuremberg, Germany) and R. Ottenjann. *Med. Klin.* 66(11):383-385, 1971.

4877 TREATMENT OF FLORID GASTRODUODENAL ULCER WITH CARBENOXOLONE PRIOR TO GASTRIC RESECTION. (Ger.) Lenz, J. (Northwest Hosp., Frankfurt/M. Praunheim, Germany), W. Hartel and G. Schuster. *Med. Klin.* 66(15):553-555, 1971.

4878 COMPARABILITY OF THE STANDARDIZED PROVOCATION TEST WITH BETAZOLE AND PENTAGASTRIN IN THE STUDY OF GASTRIC SECRETION. (Ger.) Lux, G. (Marien Hosp., Hamburg, Germany), M. Rehner and H. W. Schreiber. *Med. Klin.* 66(21):775-777, 1971.

4879 RESULTS WITH BIOGASTRONE IN PEPTIC ULCER. (Ger.) Kunz, O. (City Hosp., Munich Oberfohring, Germany). *Med. Klin.* 66(22):822-825, 1971.

4880 PEPTIC ULCER OF THE JEJUNUM. A MONTHLY REPORT ON 21 PATIENTS. (Ger.) Decker, H. R. (Univ. Surg. Clin., Erlangen, Germany), W. Schellerer and P. Hermanek. *Munch. Med. Wochenschr.* 113(12):408-411, 1971.

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4903 SURGICAL MANAGEMENT OF PEPTIC ULCERATION RECURRING POSTOPERATIVELY. (E.) Beahrs, O. H. *Surg. Clin. North Am.* 51(4): 879-883, 1971.

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See also numbers: 4608, 4624, 4973, 5125, 5299

4912 ANGIOGRAPHY IN ACUTE MECHANICAL OBSTRUCTION OF THE SMALL INTESTINE. (E.) Aakhus, T. (Ulleval Hosp., Oslo, Norway). *Acta Radiol. (Stockh.)* Suppl. 306:1-202, 1971.

A comparison was made between conventional abdominal surveys and angiograms of the superior mesenteric artery on 29 patients with simple intestinal obstruction and 25 patients with strangulating obstruction. Conventional x-rays revealed the presence of mechanical obstruction in 27 of 28 patients with simple obstruction and in 24 of 25 patients with strangulating obstruction. However, conventional x-ray films gave false-positive evidence of strangulation in 18 patients with simple obstruction; soft-tissue masses seen in the films were revealed to be fluid-filled loops of the intestine at surgery. Angiography demonstrated delayed circulation in only 1 of these patients; at surgery it was found to be caused by arterial compression which was completely compensated by a collateral blood supply. In patients with strangulating obstruction, angiograms showed the following changes: (1) arteries passing toward or into an external hernia in 3 patients, (2) an abnormal arterial course in a strangulated loop in 21 patients, (3) arterial stenosis or occlusion due to compression at the point of entry into a strangulated loop in 8 patients, (4) delayed circulation in a strangulated loop in 18 patients, and (5) displacement of adjacent arteries around an expanded strangulated loop in 10 patients. The most reliable sign of strangulation was (4).

4913 FACTORS INFLUENCING THE INCIDENCE OF POSTOPERATIVE ABDOMINAL ADHESIONS: AN EXPERIMENTAL STUDY. (E.) Storey, B. G. (U. Sydney Prof. Surg. Unit, Australia), K. B. Lawrenson, S. Chant and F. O. Stephens. *Aust. NZ J. Surg.* 40(4):388-390, 1971.

The role of some common surgical practices in the etiology of intestinal adhesions and the relationship of peritoneal suture to the formation of wound adhesions were studied in adult Wistar rats. Rats in which the intestines were not disturbed developed significantly fewer adhesions than the rats whose intestines were removed from the peritoneal cavity and placed on the abdominal wall, covered with saline-soaked gauze, or in sterile plastic bags. The incidence of wound adhesions following laparotomy was increased significantly by suturing the parietal peritoneum; however, there was no apparent relationship between the type of suture used or the method of suturing in the production of this increased incidence.

4914 IDIOPATHIC STEATORRHEA AND SMALL-BOWEL CANCER. (E.) Asch, T. (Columbia-Presbyterian Med. Ctr., New York, N. Y.) and W. B. Seaman. *Radiology* 100(2):271-275, 1971.

Three patients in whom primary small intestine cancer was associated with a sprue-like syndrome are presented and 11 cases of adenocarcinoma of the small intestine and steatorrhea found in the literature are reviewed. The ages of the 3 patients were 76, 66, and 68 yr for the female and 2 male patients, resp. All but one of the 14 cases involved cancer of the jejunum, and 9 had a long history of sprue while 5 had a shorter duration of malabsorption. An association seemingly exists between idiopathic steatorrhea and malignant tumors, especially when found in the gastrointestinal tract.

4915 THE ARTERIOGRAPHIC DEMONSTRATION OF BLEEDING IN THE DUODENAL STUMP. (E.) Silverberg, P. W. (St. Michael's Med. Ctr., Newark, N. J.). *Radiology* 100(2):315-317, 1971.

Bleeding into the duodenal stump from a branch of the gastroduodenal artery was demonstrated in 2 patients who underwent Billroth II resection using subselective common hepatic arteriograms. In both cases a pseudoaneurysm originating from a branch of the gastroduodenal artery was demonstrated. After ligation of the artery and oversewing of the pseudoaneurysm the patients made uneventful recoveries.

4916 CONGENITAL DUODENAL OBSTRUCTION IN ADULTS. (Ger.) Reismann, B. (Univ. 2nd Surg. Clin., Cologne-Merheim, Germany) and P. Deutsch. *Bruns Beitr. Klin. Chir.* 218(5):415-422, 1971.

In a 10-yr period 7 adults were treated for congenital stenosis of the duodenum; 4 case reports of this rare condition are presented. A 34-yr-old woman with a long history of vomiting and upper abdominal colic after eating had a grotesque prestenotic dilatation of the duodenum and an incomplete annular pancreas. Inside the dilated duodenum was a membranous stenosis with a central opening about 5 mm in diameter. Since the major duodenal papilla was situated in the membrane, a side-to-side duodenostomy was made immediately above and below the membrane. A 38-yr-old man with a 6-month history of upper abdominal pain which became very intense after ingestion of alcohol developed tarry stools. Surgery revealed a duodenal stenosis and complete annular pancreas into which a duodenal ulcer had perforated. In an attempt to remove the ulcer the bile duct was damaged near the duodenal papilla. A Hofmeister-Finsterer gastroenterostomy was performed and the bile and pancreatic ducts were reimplanted in the duodenal stump; pancreatitis developed postoperatively. A 52-yr-old man with a 3-week history of pain in the upper and middle abdomen, inverse duodenum, moderate dilatation of the middle duodenum, and decreased intestinal transit recovered uneventfully after a side-to-side duodenojejunostomy. A 41-yr-old woman who had nausea after meals and vomited when the right upper abdomen was palpated was successfully operated on for removal of a large duodenal diverticulum.

4917 ABSORPTION STUDIES IN PATIENTS WITH "INTRAABDOMINAL ILEOSTOMY RESERVOIRS" AND IN PATIENTS WITH CONVENTIONAL ILEOSTOMIES. (E.) Jagenburg, R. (Sahlgren's Hosp., Gothenburg, Sweden), G. Dotevall, J. Kewenter, N. G. Kock and B. Philipson. *Gut* 12(6):437-441, 1971.

The absorption of D-xylose, fat, L-phenylalanine and vitamin B_{12} were studied in 10 patients with intraabdominal intestinal ileostomy reservoirs and 10 patients with conventional ileostomies. There was no significant difference in the absorption of D-xylose, L-phenylalanine and fat between the patients with conventional ileostomies and those with reservoirs, with most values being within normal or borderline ranges. Vitamin B_{12} in serum was within the normal range in all patients. Six out of 10 patients with a reservoir had subnormal Schilling test values, whereas only one patient with conventional ileostomy had a Schilling test below 10% (subnormal).

4918 BODY FLUID COMPARTMENTS IN PATIENTS WITH NONSTRANGULATING OBSTRUCTION OF THE SMALL INTESTINE. (E.) Shin, C.-S. (Methodist Hosp., Brooklyn, N. Y.), S. Nimmannit, A. Hoff and I. F. Enquist. *Surg. Gynecol. Obstet.* 132(6):980-997, 1971.

Subjects consisted of 9 patients admitted with a later-confirmed diagnosis of nonstrangulating obstruction of the small intestine. Each case is briefly reported. All were initially treated with nasogastric suction and normal blood studies were drawn. I.V. fluids were withheld for 3 hr during which time, blood volume, extracellular volume and total body water were measured. Obstruction was diagnosed as complete at surgery in 7 and as incomplete on the basis of a roentgenogram and a positive response to suction without the necessity of surgery in the other 2. Compared with age- and sex-matched controls (Moore), plasma volume and blood volume were decreased in only 1 of the 6 patients in whom they were measured. Extracellular volume was decreased in only 2 of the 9 patients and was increased in 1. Total body water was normal or increased in 8, and was decreased in the single patient who had a decrease in blood and plasma volumes.

4919 THE RESULTS OF SMALL INTESTINE BYPASS OPERATIONS FOR THE TREATMENT OF OBESITY. (E.) Salmon, P. A. (U. Alberta Dept. Surg., Edmonton, Canada). *Surg. Gynecol. Obstet.* 132(6):965-979, 1971.

Following results from experimental studies in dogs, 2 series of obese human subjects underwent small intestine bypass operations. The first group of humans consisted of 4 females who underwent end-to-end jejunoileostomy consisting of division of the jejunum 10 inches distal of the ligament of Treitz, division of the ileum 20 inches proximal to the ileocecal valve and end-to-end anastomosis. All had 8-10 loose stools in the immediate post-operative period. In one, the weight dropped off exponentially during the first year and then leveled off, while in another the weight loss was more gradual. In the other 2, because of a too-slow weight loss, further resection was done leaving only 10 inches of jejunum and 10 inches of ileum, after which they lost weight at an accelerated rate. On this basis the second group consisted of 120 patients, of whom 110 were females. In this group, 21 had concomitant cholecystectomy, and 28 had undergone previous cholecystectomy. Follow-up data was available on 97 of the 120 patients. At follow-up, 63% of the patients operated on were not more than 20 pounds more than ideal weight. Only 6 failed to lose weight satisfactorily. Three lost more than 100 pounds but are still well above ideal weight while 2 others are in a similar situation, but are continuing to lose weight during the second post-operative year. In only one did this procedure fail completely. Weight loss was generally less in those who weighed less initially. During the 3-year postoperative period there was generally little tendency to gain weight. Weight loss correlated only with initial weight and not with percent overweight or length of bypass as percentage of total jejunoileal length. Diarrhea troubled 25% at the end of 1 yr and 13% at 2-3 yr. Postoperative electrolyte imbalance occurred in 40%, with 4 patients requiring potassium therapy and 8 requiring calcium therapy. Post-operatively, there was a mild decrease in hepatic fat infiltration, seen by biopsy and enzyme levels. Five died as a result of surgery, 4 from wound infection and 1 from pulmonary embolism.

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4921 CHRONIC DUODENAL STENOSIS CAUSED BY THE DIAPHRAGM. LATE DIAGNOSIS (17 YEARS). (Fr.) Jaubert De Beaujeu, M., M. Girard, A. Campo Paysaa and Y. Chavrier. *J. Med. Lyon* 52(1205):485-488, 1971.

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931 PIGMENTED MOLE, POLYPOSIS AND ACUTE ABDOMEN. (PEUTZ-JEGHERS SYNDROME). Ger.) Grossmann, J. (St. Josefs Hosp., Potsdam, ermany) and H. Waschulewski. *Z. Aerztl. ortbild. (Jena)* 65(3):147-150, 1971.

932 PARTIAL INVAGINATION OF MECKEL'S DIVERTICULUM AS A CAUSE OF SEVERE NTESTINAL HEMORRHAGE. (Nor.) Myking, A. O. (Gades Inst., Oslo, Norway). *Tidsskr. Nor. Laegeforen.* 91(6):427-428 & 451, 1971.

4933 MECKEL'S DIVERTICULUM AND OTHER DYSPLASIAS OF THE DUCTUS OMPHALO-ENTERICUS IN HUMANS. (Nor.) Vaage, S. (Ulleval Hosp., Oslo, Norway). *Tidsskr. Nor. Laegeforen* 91(6):416-427 & 451, 1971.

4934 A MODIFIED SINGLE LAYER SUTURE FOR USE IN THE GASTROINTESTINAL TRACT. (E.) De Almeida, A. D. (Santa Casa Misericordia Sch. Med. Sci., Sao Paulo, Brazil). *Surg. Gynecol. Obstet.* 132(5):895, 1971.

4935 THE ROLE OF NUTRITION IN THE ADAPTATION OF THE SMALL INTESTINE AFTER MASSIVE RESECTION. (E.) Wilmore, D. W. (U. Pennsylvania Sch. Med., Philadelphia), S. J. Dudrick, J. M. Daly and H. M. Vars. *Surg. Gynecol. Obstet.* 132(4):673-680, 1971.

4936 CLINICAL SIGNIFICANCE OF DUODENAL STASIS. (Rus.) Mirzaev, A. P. *Sov. Med.* 34(1):80-83, 1971.

4937 RADIOLOGICAL EXAMINATION OF THE SMALL INTESTINE. (Dut.) Sellink, J. L. (Acad. Hosp., Leiden, Netherlands). *Ned. Tijdschr. Geneeskd.* 115(17):743-748, 1971.

4938 GENERALIZED DIVERTICULOSIS OF THE SMALL INTESTINE. REPORT ON 4 CASES. (Ger.) Schopen, R. D. (City Hosp., Osnabruck, Germany), K. Lampe and M. Hudepohl. *Munch. Med. Wochenschr.* 113(12):411-415, 1971.

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4945 VASCULAR COMPRESSION OF THE DUODENUM ASSOCIATED WITH THE TREATMENT OF SCOLIOSIS. REVIEW OF THE LITERATURE AND REPORT OF EIGHTEEN CASES. (E.) Evarts, C. M. (Cleveland Clin. Found., Ohio), R. B. Winter and J. E. Hall. *J. Bone Joint Surg.* [*Am.*] 53(3):431-444 & 497, 1971.

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4949 DUODENAL DUPLICATION CYST: A CASE REPORT IN WHICH THE PANCREATICOBILIARY SYSTEM DRAINED DIRECTLY INTO THE CYST. (E.) Warren, K. W., J. C. Mountain and E. E. Erickson. *Lahey Clin. Found. Bull.* 20(3):114-120, 1971.

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4952 INTESTINAL LYMPHANGIECTASIS IN EXUDATIVE ENTEROPATHY. (Ger.) Muhrer, A. (Med. Acad. Pathol. Inst., Lubeck, Germany). *Zentralbl. Allg. Pathol.* 114(1):23-29, 1971.

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4956 ILEOVAGINAL FISTULA. COMPLICATING INTERNAL HERNIAL STRANGULATION THROUGH A BROAD LIGAMENT DEFECT. (E.) Mathieson, A. J. M. (Bridge of Earn Hosp., England) and W. G. Millar. *Br. J. Surg.* 58(5):353-355, 1971.

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See also numbers: 4673, 4682, 4683, 4716, 4775, 4794, 4832, 5150

REGIONAL ENTERITIS

966 INCOMPLETE OBSTRUCTION OF THE MESENTERIC BLOOD VESSELS AS A POSSIBLE CAUSE OF ROHN'S REGIONAL ENTERITIS. (Ger.) Dingendorf, . (Neuss-Lucas Hosp., Neuss, Germany), B. Swart nd H. Haberich. *Radiologe* 11(2):37-42, 1971.

55-yr-old man with a history of duodenal ulcer eveloped acute abdomen with angiographic signs f thrombi in 2 ileojejunal branches of the uperior mesenteric artery and edema of the small ntestine. Laparotomy showed that 70 cm of the mall intestine were discolored and edematous, ut no signs of gangrene were present and the rterial blood supply appeared to be normal. One onth later the patient showed radiological evience of regional enteritis and, 3 months later, stenoses in the middle of the small intestine. xamination of a resected portion of the small ntestine, 38 cm long, confirmed the diagnosis f Crohn's disease. After 1.5 yr no recurrences ave developed. These findings suggest that local estrictions in the blood supply or hypoxemia ay have been responsible for the primary lesion nd may explain why the ileocecal region is so ften involved in Crohn's disease.

967 THE SIGNIFICANCE OF SERUM CHOLESTEROL MEASUREMENTS IN CROHN'S DISEASE. (E.) yer, N. H. (Queen Elizabeth Hosp., Birmingham, ngland) and A. M. Dawson. *Scand. J. Gastroenterol.* (3):253-256, 1971.

ubjects in this 2-yr prospective study consisted f 44 male patients with Crohn's disease. At he onset of the study, 52% of the patients had erum cholesterol levels less than 160 mg/100 ml nd 27% had levels less than 140 mg/100 ml. hose with disease and/or resection of the ileum id not show lower levels than the others. owest levels were seen in those with colonic isease in whom the terminal ileum had been pared. Generally, those with any colon disease howed lower levels than those whose disease was onfined to the small intestine and cecum, but his was not quite significant. There was no significant difference in levels between those who were resected and those unoperated or between those who had ileocecal disease before operation and those with more extensive ileocecal involvement. There was a significant fall in serum levels with increasing disease activity, and this was not due to increased malabsorption. Generally, levels in these patients were lower than for age- and sex-matched controls and lower in fact than those recorded from a series of patients with diarrhea due to irritable bowel syndrome. There was no tendency for levels to increase with age in these patients.

4968 FINGER CLUBBING AND REGIONAL ENTERITIS. (E.) Fielding, J. F. (Gen. Hosp., Birmingham, England) and W. T. Cooke. *Gut* 12(6):442-444, 1971.

The relationship between finger clubbing and the activity of regional enteritis (Crohn's disease) was considered in 181 patients with the disease. Finger clubbing was noted in 105 (58%) of the 181 patients, in 69 (54%) of the 128 patients with small bowel disease, in 15 (62%) of the 24 patients with large bowel involvement, and in 20 (69%) of 29 with involvement of both large and small bowels. There was a significant relationship between the presence of finger clubbing and either a raised level of serum seromucoid or a decreased level of serum albumin for small bowel disease. Finger clubbing seemingly can be regarded as an index of disease and a simple clinical measure for following the progress of regional enteritis.

4969 CLINICAL AND MORPHOLOGICAL CHARACTERISTICS OF CROHN'S DISEASE. (Rus.) Milonov, O. B., R. K. Vasiliev, M. G. Revzis and T. I. Novgorodskaia. *Khirurgiia (Mosk.)* 47(3): 91-97, 1971.

See also number: 5140

4970 GLUTEN ENTEROPATHY ASSOCIATED WITH SELECTIVE IgA DEFICIENCY. (E.) Mawhinney, H. (Queen's U. Dept. Med., Belfast, Ireland) and G. H. Tomkin. *Lancet* 2(7716): 121-124, 1971.

Two patients with isolated IgA deficiency with gluten enteropathy are presented. The first patient had symptoms of adult celiac disease after an attack of virus hepatitis and was found to have no detectable IgA. The second patient had long-standing adult celiac disease and no detectable IgA. In both patients the malabsorption responded to a gluten-free diet without any change in the IgA deficiency state. IgA deficiency may be the prinary abnormality in these patients and may be involved in the pathogenesis of celiac disease.

4971 BIOCHEMICAL AND ENZYME-CYTOCHEMICAL FINDINGS IN THE HUMAN SMALL INTESTINAL MUCOSA IN MALABSORPTION SYNDROMES. (E.) Klein, U. E. (U. Kiel 1st Dept. Intern. Med., Germany) and G. Walpurger. *Digestion* 4(4):205-215, 1971.

Small intestinal biopsies were analyzed from patients with idiopathic steatorrhea, Whipple's disease, intestinal lactase deficiency and normal volunteers. The surface epithelium of the atrophic small intestinal mucosa in idiopathic steatorrhea, showing characteristic atrophy of the villi and elongation of the crypts, seemed more basophil and no longer prismatic but cubic in shape. Membrane-associated enzymes of the microvilli, alkaline phosphatase, and leucine aminopeptidase appeared to have reduced activity in several epithelial cells. Thiamine pyrophosphatase activity was more intense. Contrary to idiopathic steatorrhea, the surface epithelium in case of Whipple's disease showed the normal prismatic shape. The cytochemically detected enzyme activities of this epithelium were found as in the volunteers in a cytoarchitecturally unchanged distribution. During remission the number of macrophages decreased and the lymphangiectasia disappeared nearly completely. The small intestinal mucosa of the 3 patients with biochemically determined lactase deficiency showed no histological or cytochemical deviations from normal. Idiopathic steatorrhea as well as intestinal lipodystrophy showed a reduction of the enzymatic activities for α-glycerophosphate dehydrogenase and β-hydroxyacyl CoA-dehydrogenase. Reflections on a possible disturbance of the synthesis and breakdown of lipids common to both diseases are to be modified in so far that the changes found in Whipple's disease are reversible during clinical remission, whereas in idiopathic steatorrhea they persist in reduced potency.

4972 INTESTINAL MALABSORPTION IN MACROGLOBULINEMIA. (E.) Beker, S. (Cent. U. Venezuela Med. Sch., Caracas), P. J. Grases, F. Merino, T. Arends and J. Guevara. *Am. J. Dig. Dis.* 16(7):648-656, 1971.

A patient with an IgM monoclonal immunoglobulin disorder associated with intestinal malabsorption is presented. The patient's illness was associated with asthenia, weight loss, hepatomegaly, anemia, increase of the erythrocyte sedimentation rate and terminal renal insufficiency. Peroral small intestine biopsies taken on 3 occasions revealed changes of the type described in Waldenström's disease and not found in other types of macroglobulinemia. The malabsorption syndrome was proven by means of the Nile blue test, ^{131}I-labelled triolein and oleic acid tests, and with the d-xylose test.

4973 LACTASE INSUFFICIENCY IN GASTRECTOMIZED SUBJECTS. CRITICAL STUDY OF 50 PATIENTS. (Fr.) Paris, J., A. Gerard, J. C. Paris and J. P. Denoeux. *Lille Med.* 16(3): 387-392, 1971.

Glucose and lactose tolerance tests were run in 50 patients (45 men and 5 women, aged 28-72 yr) who had undergone gastrectomies 6 months to 25 yr before (mean of 7 yr) for peptic ulcer (45 patients) or antral neoplasms (5 patients). Only 3 patients showed evidence of latent diabetes; one of these patients had developed chronic pancreatitis after gastrectomy. Lactase deficiency was diagnosed in 17 patients (16 men and 1 woman, aged 31-70 yr) who had undergone gastrectomy 6 months to 19 yr before (mean of 5 yr). Lactase deficiency was not related to the nature of the original lesion, but occurred more often in patients who had undergone gastroduodenostomies (7 patients of 14) than in those who had undergone gastrojejunostomies (10 of 36 patients). Of the 17 patients with lactase deficiency, 8 had diarrhea with or without abdominal pain while only 3 of 33 patients without lactase deficiency had this symptom.

4974 QUANTITATIVE DETERMINATION OF INTESTINAL PEPTIDE HYDROLASE ACTIVITY USING L-AMINO ACID OXIDASE. (E.) Donlon, J. (Univ. Coll. Dept. Biochem., Galway, Ireland) and P. F. Fottrell. *Clin. Chim. Acta* 33(2):345-350, 1971.

A method for the assay of intestinal peptide hydrolase activity was described and was suitable for peptides containing either aromatic or nonaromatic amino acids. The present assay is based on a previously developed procedure for preparing peptidase zymograms by detecting the release of amino acids with the aid of L-amino acid oxidase. The kinetics of both L-amino acid oxidase and peptide hydrolase from guinea pig intestinal mucosa were examined using the assay procedure. Nonlinear kinetics of the L-amino acid peroxidase system were seen at low substrate concentrations when 0.2 M phosphate or 0.08 M tris buffers were used. The L-amino acid oxidase activity was not influenced by low concentrations of L-proline or by dipeptides such as L-leu-L-pro or L-leu-L-leu. In peroral biopsy samples of human intestinal mucosa, as little as 2 mg of material was required to measure L-leu-L pro hydrolase activity. Results showed that L-leu-L-prohydrolase activity was decreased in mucosal biopsies from patients with untreated celiac disease.

4975 COMPARISON OF INDIVIDUAL VARIATION IN ISOTOPE TESTS FOR DETERMINING GASTRO-INTESTINAL PROTEIN EXCRETION. (Ger.) Glaubitt, D. (Univ. Med. Clin., Hamburg-Eppendorf, Germany). *Nucl. Med. (Stuttg.)* Suppl. 8:675-679, 1970.

Fecal protein excretion was studied in 11 patients with protein-losing enteropathy, 15 patients with symptoms suggestive of moderately increased protein excretion, and 4 normal controls after i.v. injection of ^{51}Cr-labeled human albumin, ^{51}CrCl$_3$, ^{131}I-labeled polyvinylpyrrolidone, or ^{59}Fe iron dextran. Fecal radioactivity was highest after administration of ^{51}CrCl$_3$ and ^{51}Cr-labeled human albumin; these tests are preferred because of their great sensitivity. However, the ^{59}Fe iron dextran test should be performed on patients with urinary incontinence since very ittle of this substance is excreted in the urine. The ^{131}I-labeled polyvinylpyrrolidone test is recommended for patients with gastrointestinal bleeding since negligible quantities of this substance are bound to RBC.

4976 STUDY OF SMALL INTESTINE PLASMACYTES DURING WHIPPLE'S DISEASE. (Fr.) Cerf, . (Bichat Hosp., Paris), D. Hurez, C. Marche and . Debray. *Presse Med.* 78(48):2127-2130, 1970.

Although 4 patients with Whipple's disease had normal or elevated immunoglobulin A levels in their sera and large quantities of immunoglobulin A in their jejunal fluid, cells containing mmunoglobulins A, G, or M were absent or present only in trace quantities on the surface of the small intestine. This phenomenon was associated with a very large decrease in the number of plasmacytes in the villous epithelium of the small ntestine. These anomalies persisted in 2 atients after treatment with antibiotics had nduced clinical and biological remissions. n 3 patients anomalies were found in the ymphoblast transformation test made in the presence of phytohemagglutinin, suggesting that disorder in tissue immunity is involved. It s hypothesized that Whipple's disease is ssociated with a macrophage anomaly which is either primary or secondary to intoxication or acterial invasion.

4977 ACQUIRED AND CONGENITAL DISORDERS OF INTESTINAL TRANSPORT OF D GLUCOSE IN CHILDREN. (E.) Desjeux, J. F. (Herold Hosp., Paris), L. Sandler, P. Sassier and H. Lestradet. *Rev. Eur. Etud. Clin. Biol.* 16(4):364-366, 1971.

Subjects consisted of children who were either normal (7), or suffering from untreated (6) or treated (1) celiac disease or a glucose-galactose transport deficiency (1). All were subjected to p.o. intestinal biopsy at the level of the duodenojejunal flexure. In vitro uptake of label by the biopsy specimens was then measured after an incubation period of 45 min with 0.8 mM ^{14}C-L-alanine and 0.1 mM ^{14}C-D-glucose. Results were expressed as the ratio of the change/min/ml of intracellular fluid to the change/min/ml of incubation medium. In the 6 untreated celiac patients, the distribution ratios for both alanine and glucose were 50% of those in controls, while in the one treated case exhibiting total recovery, the values were normal. In the single case of glucose-galactose transport deficiency, the uptake of alanine was normal while there was no uptake of glucose.

4978 ABSORPTION OF DIGOXIN IN PATIENTS WITH MALABSORPTION SYNDROMES. (E.) Heizer, W. D., T. W. Smith and S. E. Goldfinger (Massachusetts Gen. Hosp., Boston). *N. Engl. J. Med.* 285(5):257-259, 1971.

The gastrointestinal absorption of digoxin (0.25 mg daily) was studied in 11 patients with malabsorption syndromes and 10 patients with no intestinal disease using a recently developed radioimmunoassay. The mean steady-state digoxin levels (after 6 days) achieved by the control subjects was 1.3 ng/ml whereas the mean steady-state levels were 0.4 ng/ml in 4 patients with sprue and 0.4 ng/ml in 5 patients with absorption defects not attributable to sprue. Two patients with pancreatic insufficiency and steatorrhea had steady-state digoxin levels within the control range. Thus, digoxin is apparently poorly absorbed by patients with malabsorption due to either mucosal defects or hypermotility.

4979 STUDIES ON THE ABSORPTION OF FAT IN INFANTS SUFFERING FROM LEINER'S DISEASE, DYSPEPSIA FROM E. coli, AND FROM STAPHYLOCOCCOSIS. (Ger.) Mester, A. (Reg. Hosp., Berettyoujfalu, Hungary), F. Bartha and G. Nagy. *Arch. Kinderheilkd.* 182(2):146-153, 1971.

4980 PROTEIN LOSING ENTEROPATHY IN A 10 YEAR OLD BOY WITH LYMPHANGIECTASIS OF THE SMALL INTESTINE. (Pol.) Pyda, E. (Med. Acad. 1st. Pediatr. Clin., Zabrze, Poland), Z. Szczepanski and J. Kasner. *Pediatr. Pol.* 46(1):71-75, 1971.

4981 MEGALOBLASTIC ANEMIA WITH POOR INTESTINAL ABSORPTION OF VITAMIN B_{12}. CONGENITAL OR ACQUIRED? (Fr.) Bonnette, J. (Cent. Hosp., St. Germain en Laye, France), J. Brussieux and E. Lagarde. *Sem. Hop. Paris* 47(11):235-241, 1971.

4982 INTESTINAL ENZYMES IN MALNUTRITION. (Por.) Marcondes, E. (Amparo Pesquisa Found., Sao Paulo, Brazil), D. Barbieri and J. V. M. Campos. *Arch. Gastroenterol. (Sao Paulo)* 7(3):151-159, 1970.

4983 DIETETIC TREATMENT OF CONGENITAL DISORDERS OF METABOLISM IN CHILDREN. III. CONGENITAL DISORDERS OF ABSORPTION AND DIGESTION OF FOOD. (Ger.) Weng, K. (Maizena Co., Hamburg, Germany). *Ernahrungs-Unschau* 18(2):52-55, 1971.

4984 LACTOSE INTOLERANCE IN SURINAM. (E.) Luyken, R. (TNO Cent. Inst. Nutr. Food Res., Zeist, Netherlands), F. W. M. Luyken Koning and M. J. T. Immikhuizen. *Maandschr. Kindergeneeskd.* 39(1):1-8, 1971.

4985 THE CLINICAL SIGNIFICANCE OF LACTOSE MALDIGESTION IN GASTROINTESTINAL DISEASES. (Fr.) Gudmand Hoyer, E. (Natl. Hosp., Copenhagen). *Med. Hyg.* 29(950):225-226, 1971.

4986 FRUCTOSE INTOLERANCE IN CHILDREN. (Fr.) Schneegans, E. (CHU Inst. Child Welfare, Strasbourg, France), G. Heumann and G. Stampfler. *J. Med. Strasbourg* 2(4):323-338, 1971.

4987 GLUCOSE-GALACTOSE MALABSORPTION IN AN ORIENTAL IRAQUI JEWISH FAMILY. (E.) Lebenthal, E. (Beilinson Med. Ctr., Petah Tikvah, Israel), R. Garti and Y. Mathoth. *J. Pediatr.* 78(5):844-850, 1971.

4988 IDIOPATHIC STEATORRHOEA AND IDIOPATHIC PULMONARY HAEMOSIDEROSIS. (E.) Lane, D. J. (Radcliffe Infirm., Oxford, England) and W. S. Hamilton. *Br. Med. J.* 2(5753):89-90, 1971.

4989 GROWTH INDICES IN 50 CASES OF CHILDHOOD CELIAC DISEASE. I. EFFECTS OF A GLUTEN-FREE DIET. (Fr.) Rey, J. (Hosp. Dis. Child., Paris), F. Rey, J. Jos and S. Amusquivar Lora. *Arch. Fr. Pediatr.* 28(1):37-47, 1971.

4990 COMPARISON OF ILEAL AND JEJUNAL BIOPSIES IN TROPICAL SPRUE. (E.) Wheby, M. S. (U.S. Army Trop. Res. Med. Lab., San Juan, Puerto Rico), V. L. Swanson and T. M. Bayless. *Am. J. Clin. Nutr.* 24(1):117-123, 1971.

4991 GLUTEN-INDUCED ENTEROPATHY. (Por.) Siffert, G., Jr. (Polyclin., Rio de Janeiro, Brazil). *Brasil Med.* 84(5):259-262, 1970.

4992 THE SYNDROME OF IDIOPATHIC TROPICAL MALABSORPTION IN THE NORTH OF INDIA. (Sp.) Misra, R. C. and H. K. Chuttani. *Dia Med.* 42(90):2732-2734, 1970.

4993 GLUCOSE-GALACTOSE MALABSORPTION. (Ger.) Fiehring, C. (Med. Acad. Pediatr. Clin., Erfurt, Germany) and H. Koslowski. *Paediatr. Grenzgeb.* 9(4):277-282, 1970.

4994 ADVANCES IN THE PATHOLOGY OF INTESTINAL ABSORPTION. (Sp.) Sanchez Villares, E. (Sch. Med., Valladolid, Spain). *Rev. Esp. Pediatr.* 26(156):675-708, 1970.

4995 PROTEIN-LOSING GASTROENTEROPATHIES. WEEKLY CLINICAL CONFERENCE OF THE SECTION OF GASTROENTEROLOGY OF THE UNIVERSITY OF MICHIGAN. (E.) French, A. B. *Am. J. Dig. Dis.* 16(7):661-666, 1971.

4996 SURGICAL MEASURES IN THE TREATMENT OF GASTROINTESTINAL PROTEIN LOSS. (Ger.) Fuchs, K. (Gen. Surg. Clin., Gottingen, Germany), H. D. Becker and H. J. Peiper. *Dtsch. Med. Wochenschr.* 96(19):815-817, 1971.

4997 SOJAVAL FOR THE MILK FREE TREATMENT OF INFANTS WITH MALABSORPTION OF LACTOSE OR INTOLERANCE OF GALACTOSE. (Ger.) Beyreiss, K. (Karl Marx U. Pediatr. Clin., Leipzig, Germany), R. Kunzel and S. Liebe. *Dtsch. Gesundheitsw.* 26(7):308-314, 1971.

4998 LACTOSE MALABSORPTION IN HEALTHY AND MALNOURISHED PERUVIAN MESTIZO CHILDREN. (E.) Paige, D. M. (Johns Hopkins U. Sch. Med., Baltimore, Md.), E. Leonardo and A. Cordano. *Am. J. Clin. Nutr.* 24(5):599-600, 1971.

4999 PTEROYLPOLYGLUTAMIC ABSORPTION IN ADULTS WITH ANCYLOSTOMIASIS. (E.) Echeverri, L. (Sch. Med., Medellin, Columbia), T. Necheless, H. Velez and J. J. Vitale. *Am. J. Clin. Nutr.* 24(5):596-597, 1971.

5000 MALABSORPTION IN ASYMPTOMATIC LIBERIAN CHILDREN. (E.) Rhodes, A. R. (Columbia U. Coll. Physicians Surg., New York, N. Y.), N. Shea and J. Lindenbaum. *Am. J. Clin. Nutr.* 24(5):574-577, 1971.

5001 THE SIGNIFICANCE OF COPROANTIBODIES TO COW'S MILK PROTEINS. (E.) Kletter, B. (Hebrew U. Hadassah Med. Sch., Jerusalem), S. Freier, A. Michael Davies and I. Gery. *Acta Paediatr. Scand.* 60(2):173-180, 1971.

5002 CELIAC DISEASE. (E.) Rubin, W. (Med. Coll. Pennsylvania, Philadelphia). *Am. J. Clin. Nutr.* 24(1):91-111, 1971.

5003 SUCROSE INTOLERANCE. (Gr.) Hadjigeorgiou, E. *Delt. Paidiatr. Klin. Panep. Athin.* 17(4):273-278, 1970.

5004 LACTOSE INTOLERANCE IN TWO SIBLINGS COMPLICATED BY ULCERATIVE COLITIS IN ONE. (Gr.) Kattamis, C., G. Adam and K. Anastassea Vlachou. *Delt. Paidiatr. Klin. Panep. Athin.* 17(4):279-285, 1970.

5005 LABORATORY DIAGNOSIS OF INTESTINAL MALABSORPTION. (It.) Lindquist, B. (U. Lund Dept. Pediatr., Sweden). *Rif. Med.* 84(50):1373-1378, 1970.

See also numbers: 4510, 4675, 4695, 4773, 5123, 5141

5006 PSYCHOLOGICAL SIGNIFICANCE OF IRRITABLE COLON SYNDROME. (E.) Hislop, I. G. (Queen Elizabeth Hosp., Woodville, Australia). *Gut* 12(6):452-457, 1971.

The significance of psychological factors in the irritable colon syndrome was studied in 67 patients with this disorder. Symptoms of an affective disorder were absent in only 3 patients in the series and psychogenic abdominal pain occurred in 64. Nineteen patients were treated with phenothiazine (trifluoroperazine): 5 reported symptomatic improvement in abdominal and affective symptoms, 4 sustained complete relief, and 10 responded poorly. Antidepressant therapy was administered in 56 patients. Twenty-nine became symptom free, 16 showed definite improvement, and 11 reported no benefit (20%). Treatment directed towards the alleviation of the psychological reaction appeared to result in eradication of gastrointestinal symptoms in most cases.

5007 SYSTEMIC SYNDROMES ASSOCIATED WITH NEOPLASTIC DISEASE INCLUDING CANCER OF THE COLON. (E.) Bartholomew, L. G. (Mayo Clin., Rochester, Minn.) and A. J. Schutt. *Cancer* 28(1):170-174, 1971.

Dermatologic manifestations of cancer of the colon include dermatomyositis, acanthosis nigricans, herpes zoster and Peutz-Jeghers syndrome. Carcinoma of the rectum was found to have an insignificant association with neuromyopathy whereas carcinoma of the colon was found to have an incidence of about twice that of controls. Carcinoma of the colon has been associated with symptoms mimicking those of Cushing's syndrome, insulinoma, carcinoid syndrome and hypercalcemia. Cardiovascular manifestations of varying types have been known to usher in serious disease, in particular visceral malignancies. The most common lesions are thrombophlebitis and lymphedema but also a more spectacular disease, acute digital ischemia, has been reported. Villous tumors of the colon constitute about 3% of all colon carcinomas and are related to a characteristic systemic syndrome with marked loss of electrolytes, principally sodium, potassium, and chloride, and occasionally calcium, in the voluminous rectal discharges of mucus.

5008 POLYPS OF THE RECTUM AND COLON. (E.) Potet, F. (Beaujon Hosp., Clichy, France) and J. Soullard. *Gut* 12(6):468-482, 1971.

The incidence and distribution of polyps of the large bowel, the relationship of polyps to cancer, and the question of malignancy were studied in 433 patients with adenomatous polyps discovered on proctoscopic examination. Men were affected more often than women and these lesions were rarely seen in patients up to 40 yr of age. Polyps were more frequent in the rectum and sigmoid colon than in any other part of the colon. Bleeding was the only significant symptom and was found in 64.5% of the cases, however, in 25% of the cases in which bleeding occurred hemorrhoids were present. Fifty three percent of the polyps were judged to be benign and 29% potentially or actually malignant. The proportion of benign lesions decreased with increasing size of the polyps and 55% of polyps with long peduncles were potentially or actually malignant. Potentially malignant types were much more frequent in women, however, in neither sex did multiplicity of lesions increase the risk of malignancy. While well differentiated adenomas were stable, dedifferentiated lesions led to invasive cancer in some cases, usually over a long period of time. Thus, histological differentiation of polyps seems to be the most satisfactory way to distinguish between benignancy and malignancy.

5009 THE RATIONALE OF PRACTICE FOR POLYPOID LESIONS OF THE COLON. (E.) Spratt, J. S., Jr. (Cancer Res. Ctr., Columbia, Mo.) and F. R. Watson. *Cancer* 28(1):153-159, 1971.

Asymptomatic colonic polyposis is rarely diagnosed unless it is visualized by endoscopy, barium or barium-air contrast roentgen studies. Microscopic taxonomy correlated with the gross rates of growth and the observed prevalence have shown that the most frequent polyps are the scattered slow growing adenomatous polyps that increase in incidence with age. By comparing the fastest observed growth rate for proven cancer to the average remaining life span, it is noted that in most cases few persons past age 85 yr merit exhaustive diagnostic evaluation of the colorectum if they are asymptomatic. The rationale of practice must be based on the avoidance of adverse effects of the host attributable either directly or indirectly to polypoid lesions. Based on data from the vital statistics, autopsy studies, and clinical management reviews, a rationale of practice was developed that is intended to keep adverse effects of polypoid lesions to a minimum with the avoidance of unnecessary cost, nonbeneficial clinical effort, and morbidity.

5010 NONSPECIFIC ULCERATION OF THE CECUM. (E.) Benninger, G. W. (Lenox Hill Hosp., New York, N. Y.), L. J. Honig and H. D. Fein. *Am. J. Gastroenterol.* 55(6):594-601, 1971.

A patient with nonspecific ulceration of the cecum is presented and the current views on pathological findings, clinical findings, diagnosis and treatment of cecal ulceration are reviewed. The etiology of this uncommon disease is unknown. Diagnosis is made difficult by the fact that there are no clear signs or symptoms which differentiate this disorder from more common right lower abdominal diseases. It is most often confused with appendicitis, and hemicolectomy is the treatment of choice when possible. Grossly, the ulcer of the cecum is solitary, punched out, penetrates the muscle coats and occurs in close proximity to the ileocecal valve; thus, it resembles carcinoma. The preoperative, operative and postoperative complications seen in cecal ulceration are clearly illustrated by the case presented.

5011 PERFORATED APPENDICITIS IN CHILDREN. (E.) Stone, H. H. (Emory U. Sch. Med., Atlanta, Ga.), S. L. Sanders and J. D. Martin, Jr. *Surgery* 69(5):673-679, 1971.

A 10-yr experience with appendicitis in children 16 yr of age or younger was reviewed to determine which factors play a role in favoring the development of infectious complications. Of the 677 children studied, 398 (58.7%) had gangrenous, perforated, or abscessed appendicitis on admission or at the time of operation. The younger the child, the more likely it was that gangrene or perforation had occurred. A definite trend toward a greater number of perforations was observed during the 10-yr period, increasing from 40.6% in 1960 to 83.4% in 1968. There were no deaths from appendicitis in this group of children; however, one or more of 151 complications developed in 23.6% (123) of the patients in whom appendectomy was performed. Of the complications, 139 were infections, and 127 of these were located in the surgical incision or within the peritoneal cavity. While 6.5% of the children with simple acute appendicitis had complications, 29% of those with gangrenous or perforated appendicitis had one or more complications after appendectomy. The incidence of intra-abdominal abscess in children with gangrenous or perforated appendicitis was significantly reduced by the preoperative administration of i.v. antibiotics, and these abscesses were confined to the pelvis by raising the head of the patient's bed. By delaying the closure of the skin and s.c. portions of the surgical incision, this group also showed a decrease in the frequency of wound infections.

5012 RESULTS OF TREATING CANCERS OF THE LEFT COLON BY PARTIAL COLECTOMY. A SERIES OF 100 CASES. (Fr.) Peycelon, R. (E. Herriot Hosp., Lyon, France) and R.-P. Correard. *Ann. Chir.* 25(5-6):235-242, 1971.

Of 122 patients with carcinomas of the left colon, 100 (53 men and 48 women, aged 18-84 yr; mean age 65 yr) underwent curative surgery. Tumors were located in the upper sigmoid in 65 patients, in the splenic flexure in 12, and in the descending colon in 14. Very advanced forms of cancer were present in 44 patients; complications consisted of fistulas (8) and infections (9). Associated lesions, which were present in 12 cases, consisted of polyps (2), ulcerative colitis (1), sigmoid diverticulosis (8), and multiple carcinomas in the sigmoid and under the splenic flexure (1). Cancer was manifested by acute complications in 36 cases. These included obstruction of the colon (26), infectious complications (9), and the rupture of a sigmoid tumor into the external iliac artery which resulted in a severe hemorrhage (1). The high postoperative mortality (22%) after partial colectomy is attributed to the age of the patients, the large percentage of patients on whom surgery was performed, and the large percentage of patients with advanced czncer. However, when nonsurgical deaths were eleminated, the postoperative mortality decreased to 14%. Surgical complications consisted of parietal suppuration (5 cases), thromboembolisms (3 cases), and fecal fistulas (10 cases). Long-term follow-ups, performed on 72 of the 78 survivors, showed that 58 patients survived for 5 yr; good results were obtained in 21. Nonoperative deaths were caused by metastases (22 patients), local recurrences (12 patients), and multiple cancer (4 patients).

5013 PROLIFERATION AND DIFFERENTIATION OF NORMAL AND NEOPLASTIC CELLS IN THE COLON OF MAN. (E.) Lipkin, M. (Cornell Med. Coll., New York, N.Y.). *Cancer* 28(1):38-40, 1971.

Abnormal characteristics of colonic epithelial cells believed to be part of the natural history of carcinomas developing in man were described. In several neoplastic lesions the duration of the G_2 premitotic phase of the proliferative cell cycle has been found to be greater than normal, and in a single colonic carcinoma, some cells appeared to remain in the G_2 phase for days. On their migration to the surface of the mucosa, when normal epithelial cells move through the midregion of the colonic crypts, DNA synthesis and mitosis are repressed, and metabolic reactions (nucleic acid metabolism) connected with proliferative activity decrease. However, in the colonic mucosa of patients who develop polypoid lesions, patches of normal-appearing mucosa contain colonic epithelial cells with an enhanced capacity to proliferate. These cells have not repressed DNA synthesis during their migration, and they incorporate more uridine into RNA and leucine into protein than normal colonic surface cells. In neoplastic lesions of increasing size and malignant potential, despite morphological evidence of differentiation, additional abnormalities in nucleic acid enzyme activity develop, and patterns of immature proliferative cells persist.

5014 MALIGNANT POTENTIAL OF POLYPOID LESIONS OF THE COLON AND RECTUM. (E.) Horn, R. C., Jr. (Henry Ford Hosp., Detroit, Mich.). *Cancer* 28(1):146-152, 1971.

More than half of 2000 polypoid lesions of the colon and rectum studied over a recent 5-yr period were diagnosed as adenomatous polyps. Four-fifths of 91 papillary adenomas were diagnosed when the patients were between the ages of 50 and 79;

almost two-thirds occurred in males. Most tumors were 2 cm or more in diameter and were located in the rectum. The principal symptom of all tumors was bleeding. Almost one-third of 91 patients had additional papillary adenomas, adenomatous polyps, or carcinomas of the colon or rectum. The adenomatous polyp was the most common. Lesions developing subsequently did so at anatomic sites distinct from that of the previous papillary adenoma. The diagnosis of carcinoma was made 9 times in this series, but only 5 of these were invasive tumors. This study did not support the belief that the papillary (villous) adenoma of the colon or rectum is a frequent or important prelude to cancer. However, complete excision was suggested as the only effective way to avoid local recurrence and even possible late cancer development.

5015 ADENOMAS OF THE RECTUM AND COLON: CLASSIFICATION AND PROGNOSIS. (Fr.) Soullard, J. and F. Potet (Beaujon Hosp., Paris). *Ann. Med. Interne* 122(2):175-190, 1971.

Of 530 patients with polyps of the rectum and colon, 433 (89.3%) had adenomas. Adenomas were associated with rectal bleeding in 64.5% of these patients, and rectal bleeding was present in 90% of the patients with polyps larger than 15 mm in diameter. Adenomas were benign in 53% and definitely or potentially malignant in 29% of the patients; 1/2-2/3 of the tumor was undifferentiated but malignancy could not be established in 18%. Polyps less than 5 mm in diameter were not as likely to be malignant or potentially malignant (10%) as were large polyps with long pedicles (55%). With the exception of villose adenomas, the percentage of malignant polyps did not increase much with age in patients between 40-70 yr. The incidence of malignant adenomas was much higher in women (70%) than in men (45%) although women are much less likely to develop rectal or colonic adenomas. About 25% of the patients had 2 polyps or more. The incidence of multiple polyps did not increase appreciably with age and, with the possible exception of Morson's type of hyperplastic polyps, multiple polyps were no more likely to be malignant than single polyps. Of 174 carcinomas which were removed surgically, none was less than 10 mm in diameter. Follow-ups, made in 217 of 433 patients, showed that 47 (22%) developed recurrences after they were removed. Only 19% of the benign polyps recurred in contrast to 30% of potentially malignant polyps.

5016 THE FATE OF ILEORECTAL ANASTOMOSIS IN CROHN'S DISEASE. (E.) Burman, J. H. (Gen. Hosp., Birmingham, England), W. T. Cooke and J. A. Williams. *Gut* 12(6):432-436, 1971.

The effectiveness of ileorectal anastomosis in the treatment of Crohn's disease of the colon was assessed in 25 patients. There was a proven leak from the anastomotic site between 3 and 5 days after surgery in 8 patients (32%). Performing a "safety valve" ileostomy, unavoidably leaving diseased intestine at the level of anastomosis, and steroid therapy had no significant effect on the incidence of leakage at the anastomotic site. Of 14 patients who had small as well as large intestinal disease, recurrence occurred in 10 (71%), whereas the recurrence rate was only 45% (5 patients) in the 11 patients in whom the large intestine alone was involved. The age of the patient and duration of disease did not affect the likelihood of recurrence.

5017 CANCER OF THE COLON AND RECTUM AND ADENOMATOUS POLYPS. A REVIEW OF EPIDEMIOLOGIC FINDINGS. (E.) Haenszel, W. (NCI, Bethesda, Md.) and P. Correa. *Cancer* 28(1):14-24, 1971.

International epidemiological comparisons of age-adjusted rates, as well as information contained in the patterns of sex and age-specific incidence were reviewed for colonic and rectal cancer. A model for colonic cancers that may fit most of the facts was proposed for further testing and includes the following features. In low risk populations where the disease is endemic, colon cancers are concentrated in the cecum and ascending colon, female cases are preponderant, and most of the rise to the maximum incidence level has occurred by age 50-55. When a new etiologic factor is introduced into such a population, the transition from an endemic to an epidemic phase is first expressed as a rise in sigmoid cancers among men over a 55-yr period. A rise in female sigmoid cancer follows later and the time lag is reinforced by a tendency for these female cases to appear at relatively older ages than with males. As exposures to the etiologic factor become more intense and prolonged, a later phase is characteristically a rise in cecum and ascending colon cancer, especially in males. The above model fits most of the facts obtained from epidemiological findings for intestinal cancer. The unifying idea in the model is the greater volatility in male response to changed conditions.

5018 DIVERTING ILEOSTOMY OR COLOSTOMY IN THE MANAGEMENT OF CROHN'S DISEASE OF THE COLON. (E.) McIlrath, D. C. (Mayo Clin., Rochester, Minn.). *Arch. Surg.* 103(2):308-310, 1971.

Over a period of 3 yr (1967-1970) 13 patients with Crohn's disease of the colon and rectum were treated by either colostomy or ileostomy. The disease involved the entire colon in 8 patients and was limited to the sigmoid and rectosigmoid areas of the colon in 5 patients. The predominant indications for surgery were severe perianal complications in 8 patients, retardation of growth and development in 2, and failure of medical management in 3 others. The clinical condition of all patients improved after colon bypass due to reduction or absence of fever, weight gain, increase in appetite and disappearance of abdominal ain. Objective improvement of colitis was oted in 6 of the 13 patients, while complete egression of disease occurred in only 4 patients. he major problem had been the failure of severe erirectal complications (especially perianal nd rectovaginal fistulas) to subside after byass. It may be necessary to perform bypass olostomy or ileostomy before perirectal compliations advance to an irreversible state.

019 DIVERTICULITIS OF THE APPENDIX. REPORT OF SIXTY-ONE CASES. (E.) Duchênes, L. St. Sacrement Hosp., Quebec, Canada), J. Couture nd R. Garneau. *Am. J. Surg.* 121(6):706-709, 971.

inety cases of diverticulitis of the appendix ere studied and the clinical observations in 1 cases were compared with those in 61 cases f acute appendicitis chosen at random. Five orphologic types of diverticular disease of the ppendix could be defined: primary acute divertiulitis with or without acute peridiverticulitis 61 cases); acute diverticulitis secondary to cute appendicitis (7 cases); diverticulum without nflammation (16 cases); diverticulum with acute ppendicitis (5 cases); and chronic peridivertiulitis with acute appendicitis (1 case). Some imilarity in the clinical picture was seen between cute diverticulitis of the appendix and acute ppendicitis; however, the 2 disorders differed ith regard to age of the patients, type of bdominal pain, and operative findings. These disorders seem to be distinct clinical entities n some respects.

020 HISTOPLASMA COLITIS: AN ELECTRON MICROSCOPIC STUDY. (E.) Kirk, M. E. Montreal Gen. Hosp., Quebec, Canada), J. Lough nd H. A. Warner. *Gastroenterology* 61(1):46-54, 971.

equential biopsies obtained from a patient with ntestinal histoplasmosis before, during, and fter therapy with amphotericin B were studied sing light and electron microscopy. Before herapy, many viable-appearing, budding fungi ere visible within histiocytes. Only dead and egenerating organisms were seen in the biopsy aken at the completion of amphotericin therapy. hese organisms showed no internal structure; uclei, dense bodies, mitochondria, and plasma embrane were absent. One year later, the mucosa ppeared normal and no organisms could be demontrated with Grocott or positive acid-Schiff tains. With the electron microscope, occasional acrophages were distended by globular aggregates ith an electron density similar to that of the ell wall of intact organisms.

021 MANAGEMENT AND MISMANAGEMENT OF BLEEDING COLONIC DIVERTICULA. (E.) Ramanath, H. K. and J. R. Hinshaw (Rochester Gen. Hosp., N. Y.). *Arch. Surg.* 103(2):311-314, 1971.

The operative and nonoperative management was evaluated in 100 patients who experienced 144 episodes of bleeding from colonic diverticula. Most patients had had gastrointestinal signs or symptoms (constipation, diarrhea and abdominal pain) prior to hospitalization for bleeding. In 16 patients colonic bleeding was the first manifestation of diverticular disease. In their first or only episode of bleeding 58 patients had bright red blood in the stool while 42 had only black, tarry stools. The severity of bleeding in 60 (41.5%) of the episodes of bleeding was massive, patients requiring a transfusion of 1500 ml or more. Of 81 patients treated with a medical regimen (bed rest, sedation, diet restriction) alone, 4 patients died and 18 patients had recurrent bleeding. All of the 19 patients operated on were initially treated with a medical regimen and all but one were massive bleeders and had had multiple recurrences of bleeding before operation. Unfortunately, incorrect operative procedures were frequently performed. Five of the 10 patients on whom a sigmoid resection was performed experienced recurrent bleeding due to the lack of excision of one bleeding area. In 2 patients blind resection of the left colon was followed by continued massive bleeding necessitating right hemicolectomy. With extensive diverticular disease, total abdominal colectomy with ileoproctostomy is apparently the procedure of choice.

5022 MORTALITY OF THE SURGICAL TREATMENT OF DIVERTICULITIS. (E.) Botsford, T. W. (Peter Bent Brigham Hosp., Boston Mass.), R. M. Zollinger, Jr. and R. Hicks. *Am. J. Surg.* 121(6):702-705, 1971.

The mortality rate of 252 patients with surgically treated diverticulitis, proved by pathologic diagnosis, was studied. The overall mortality was 8.3% (21 deaths); 11 due to perforation and gram negative sepsis, 5 due to anastomotic leak with sepsis, 5 due to anastomotic leak with sepsis, and 5 due to unrelated causes. Patients who had only colostomy with or without drainage fared the worst (46.1% mortality), while patients who had staged operative procedures showed better results, the 2-stage procedure being the best. In this series, genito-urinary complications included 14 colovesical fistulas, 6 colovaginal fistulas, and 2 cases of ureteral obstruction.

5023 ISCHEMIC COLITIS CAUSED BY EXPERIMENTAL VOLVULUS. (Ger.) Hermanek, P. (U. Erlangen-Nuremberg Surg. Clin., Germany) and E. Muhe. *Z. Exp. Chir.* 4(2):115-120, 1971.

Volvulus was produced in 9 male dogs by rotating the colon near the left flexure by 360° and suturing it in this position. At laparotomies, performed 6-20 hr later, the sutures were removed and the colon replaced in its original position in 8 dogs; the colon had spontaneously reverted to its original position in 1 dog. When autopsied 1-10 days later, 4 of these 8 dogs had hemorrhagic infarction involving all layers of the intestine. In animals which survived the longest, necrotic mucosa and submucosa were replaced by granulation tissue which contained many capillaries; connective tissue proliferated rapidly and stenosis resulted. Gangrene developed in some animals. These changes are identical to those observed in ischemic colitis in man. Perforation and diffuse peritonitis occurred in 3 of the 4 dogs with hemorrhagic infarction.

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istological examination of the thymus in 8
ases showed that 3 of these patients had num-
rous lymph follicles with active germinal centers
nd enlarged thymus lymph nodes. These patients
ere 28-46-yr-old and had histories of ulcerative
olitis dating back 4-11 yr. One of these
atients had rheumatoid spondylitis, but the other
had no evidence of any associated diseases.
hese findings are considered to be evidence for
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5093 DIAGNOSIS AND INCIDENCE OF ENTEROPATHOGENIC *Escherichia coli* SEROTYPES IN ACUTE INFANTILE ENTEROCOLITIS. (Rum.) Domokos, L. (Inst. Med. Pharmacol., Tirgu Mures, Rumania), M. Sabau and Z. Pap. *Pediatria (Bucur.)* 19(6): 489-496, 1970.

5094 PNEUMATOSIS CYSTOIDES INTESTINALIS AND NECROTIZING OF ENTEROCOLITIS (10 PERSONAL CASES). (Sp.) Rodriguez Vigil, E. (Asturias Gen. Hosp., Oviedo, Spain), M. J. Martin Aguado, J. Lopez Sastre and C. Rodriguez Valcarcel. *Rev. Esp. Pediatr.* 26(156):757-780, 1970.

See also number: 5139

5095 THE ROLE OF THE EXOCRINE PANCREAS IN THE STIMULATION OF INSULIN SECRETION BY INTESTINAL HORMONES. III. INSULIN RESPONSES TO SECRETIN AND PANCREOZYMIN, AND TO ORAL AND INTRAVENOUS GLUCOSE, IN PATIENTS SUFFERING FROM CHRONIC INSUFFICIENCY OF THE EXOCRINE PANCREAS. (E.) Raptis, S. (U. Ulm Intern. Med. Ctr., Germany), R. M. Rau, K. E. Schröder, W. Hartmann, J.-D. Faulhaber, P. H. Clodi and E. F. Pfeiffer. *Diabetologia* 7(3):160-167, 1971.

The effect of secretin and pancreozymin on insulin secretion, blood sugar, free fatty acids and glycerol were studied in 11 nondiabetic patients with evidence of chronic pancreatic insufficiency and 30 normal controls. Plasma insulin levels were increased significantly by the intestinal hormones in normal subjects, whereas no increases were seen in patients with exocrine pancreatic insufficiency in response to either secretin or pancreozymin. The administration of these hormones caused a significant decrease in fatty acids and glycerol in normal subjects, but they were followed by increases in the patient group. There were no differences in blood glucose or immunologically measurable insulin (IMI) concentration between groups in response to i.v. glucose injection. When glucose was administered orally, however, plasma IMI increments in the patients were significantly smaller than in controls. Free fatty acids and free glucose fell more strikingly after oral than after i.v. glucose in the normal subjects while no differences were seen in patients with chronic pancreatic insufficiency. The insulin stimulating action of the intestinal hormones seems to be abolished in the absence of normal exocrine pancreatic tissue. A "glucose receptor" of the β cell or its surface may work more or less independently of both the exocrine pancreatic tissue and the intestinal hormones.

5096 PANCREAS TRANSPLANTATION IN MAN. I. THE DONOR AND RECIPIENT OPERATION. (E.) Merkel, F. K. (Northwestern U. Med. Ctr., Chicago), S. M. Poticha, E. J. Nudelman, J. A. Colwell and J. J. Bergan. *Arch. Surg.* 103(2): 205-210, 1971.

The donor operation has been refined so that the substance of the pancreas is not traumatized. The stomach, jejunum, and ileum are excised and discarded, leaving the pancreas isolated in full view. Use of the spleen as a handle allows separation of the pancreas from the posterior abdominal wall, again without touching the organ. Identification and preservation of the duodenal blood supply is another factor which is essential for success. A patient with edema, circulatory congestion, nephropathy, and hypertension received a kidney and pancreas transplant and tolerated the operation extremely well, there being also immediate correction of his carbohydrate defect. To avoid leaks in the duodenal stump seen in the limited number of pancreatic transplants reported, the small supraduodenal vessels should be identified and preserved just as carefully as the larger superior pancreaticoduodenal arteries. Decompression of the duodenum is an important step which aids in avoiding edema in the grafted intestine. Lessons learned in pancreas transplantation are applicable to more common abdominal procedures.

5097 ARCHITECTONICS OF THE NERVOUS SYSTEM IN THE HUMAN PANCREAS FROM A CLINICAL STANDPOINT. (Fr.) Kroutikova, I. F. (Inst. Med. Hyg., Leningrad, USSR). *Acta Anat.* 78(1):58-66, 1971.

Anatomical studies of the pancreas from 50 cadavers or patients who underwent pancreatectomy and from 20 patients operated on for chronic pancreatitis, pancreatic necrosis, or pancreatic cancer revealed that the bile duct is linked directly with connective tissue in the head of the pancreas by 2-5 fibers. These nerves are believed to regulate excretion of bile and pancreatic juice into the duodenum. Insufficiency of these nerves may account for such disorders as duodenal stasis and biliopancreatic reflux. In patients with pancreatic cancer and chronic pancreatitis with complete intralobular induration, structural changes were found in the parenchyma and intrapancreatic nervous system, but the neuroinsular complexes remained unchanged. This explains why these patients had fasting blood sugar levels in the upper normal range, normal glucose tolerance tests, and little or no urinary glucose. In many patients with hepatobiliary and intestinal diseases degeneration and dissolution of nerve fibers and neurons in the pancreas was associated with hemodynamic changes and a rapid onset of vascular dystonia.

5098 RESULTS OF PALLIATIVE OPERATIONS FOR CARCINOMA OF THE PANCREAS. (E.) Feduska, N. J., T. L. Dent and S. M. Lindenauer (Univ. Hosp., Ann Arbor, Mich.). *Arch. Surg.* 103(2): 330-334, 1971.

Among 98 patients undergoing surgery, 22 had diagnostic, 60 had palliative operations and 16 underwent pancreaticoduodenectomy as potentially curative procedures in the absence of any obvious metastases. Most pancreatic tumors were located in the head of the pancreas. The operative mortality following diagnostic operations was 41%; following palliative operations 33%; and following curative operations, 44%. Only 53% of the 60 patients who had palliative operations were relieved of any symptom (pain, weight loss, jaundice), when operative deaths were excluded. Pancreaticoduodenectomy resulted in relief of symptoms in 67% of

he patients surviving the operation. Duration
f survival, like operative mortality, was af-
ected adversely by the presence of hepatic and
onhepatic metastases at the time of initial
peration. In contrast to palliative biliary and
astric decompression, curative pancreaticoduo-
enectomy, while failing to effect a cure, provided
he best method of palliation.

099 PANCREATIC DEGENERATIVE ATROPHY IN DOGS. (E.) Hill, F. W. G. (U.
ristol Dept. Vet. Med., England), A. D. Osborne
nd D. E. Kidder. *J. Comp. Pathol.* 81(3):321-330,
971.

ight cases of canine pancreatic insufficiency
re reported. Clinical signs included increased
ppetite, emaciation, and yellow putty like feces.
erum cholesterol was reduced in all and SGPT
nd plasma alkaline phosphatase were elevated in
ost cases. All 8 cases showed fat malabsorption
nd steatorrhea, irrespective of whether a low
r high fat diet was fed. Xylose absorption
as normal, indicating that the small intestine
ucosa was intact. Following oral glucose
olerance test, the plasma level in 7 cases rose
o over 200 mg % and the glucose level never
eturned to normal within 2 hr of giving the
est dose. All cases were judged to have sub-
linical diabetes mellitus. All showed low
evels of fecal trypsin. Microscopic examination
f the pancreas revealed a marked reduction in
he size of the lobules, due to much smaller
cinar cells, with much loose connective tissue
etween. The pancreatic degenerative atrophy
ay be the result of a mild degenerative and
ossibly inflammatory process.

100 PROBLEMS RELATED TO THE CLINICAL PICTURE AND SURGICAL TREATMENT OF CLOSED IN-
URIES OF THE PANCREAS. (Bul.) Chervenkov, P.
. *Khirurgiia (Sofiia)* 23(5):438-443, 1970.

101 SECONDARY MONOCLONAL GAMMAPATHY. OBSTRUCTIVE JAUNDICE DUE TO NEOPLASIA OF
HE HEAD OF THE PANCREAS. (Sp.) Rubies Prat, J.
City Sanitar. Barcelona, Spain), R. Bacardi
oguera and J. Garcia Jimenez. *Med. Clin. (Barc.)*
5(6):459-464, 1970.

102 PANCREATIC CONTUSION COMPLICATED BY PANCREATITIS AND PANCREATIC FISTULA.
Pol.) Berner, J. (Med. Acad. 3rd Surg. Clin.,
odz, Poland) and B. Janowski. *Pol. Przegl.*
hir. 42(11):1709-1711, 1970.

103 THE SURGERY OF CANCER OF THE PANCREAS. (Sp.) Bazan Gonzales, A. (Obrero Hosp.,
ima, Peru) J. J. Carrion Perez and N. Alzamora
astro. *Rev. Med. Caja Nac. Seguro Soc.* 19(3):
60-284, 1970.

5104 INJURIES OF THE PANCREAS IN BLUNT ABDOMINAL TRAUMA. (Rus.) Kutuzov, I. I. *Vestn. Khir.* 105(12):84-86, 1970.

5105 ISOLATED BLUNT TRAUMA OF THE PANCREAS. (Dut.) Lubbers, E. J. C. (St. Radboud Hosp., Nijmegen, Netherlands). *Tijdschr. Gastroenterol.* 13(6):427-438, 1971.

5106 PANCREATODUODENECTOMY AS OPPOSED TO EXTERNAL DRAINAGE AND TRIPLE DERIVATION. (Fr.) Guillemin, G. and Y. Salembier. *J. Chir. (Paris)* 101(1):99-103, 1971.

5107 INDICATIONS FOR PANCREATECTOMY. (Ger.) Hess, W. (Limmatquai 122-124, Zurich). *Dtsch. Med. Wochenschr.* 96(1):41-42, 1971.

5108 PANCREATIC ASCITES TREATED BY IRRADIATION OF PANCREAS. (E.) Kavin, H. (Johannesburg Hosp., South Africa), J. D. Sobel and A. J. Dembo. *Br. Med. J.* 2(5760):503-504, 1971.

5109 DEMONSTRATION OF PARENCHYMATOUS LESIONS OF THE PANCREAS BY A TECHNIQUE OF AXIAL TRANSVERSE ECHOTOMOGRAPHIES. (Fr.) Melki, G. (Laennec Hosp., Paris). *C. R. Acad. Sci. [D] Paris* 271(25):2455-2457, 1970.

5110 ECTOPIC PANCREAS. (Fr.) Clot, P. (Cochin Hosp., Paris), A. Deloche De Noyelle and G. Lemaigre. *J. Chir. (Paris)* 100(6): 503-514, 1970.

5111 A GIANT CYST OF THE PANCREAS. (Rus.) Lysikh, I. K. *Khirurgiia (Mosk.)* 47(3): 134-135, 1971.

5112 PSEUDOCYSTS OF THE PANCREAS IN CHILDREN. (Ger.) Martin, J. (Dresdner Str. Clin., Karl-Marx-Stadt, Germany) and K. Unger. *Kinderaerztl. Prax.* 39(1):7-15, 1971.

5113 HEPATIC CHANGES IN MUCOVISCIDOSIS. (Pol.) Bogacka, E. (Med. Acad. Pediatr. Dis. Clin., Wars, Poland), T. Newecka and T. Zalewski. *Pediatr. Pol.* 46(1):21-28, 1971.

5114 CARCINOMA OF THE PANCREAS. A PATHOLOGICAL AND CLINICAL ANALYSIS OF A SERIES OF AUTOPSY CASES. (Sw.) Jarnerot, G. (Reg. Hosp., Linkoping, Sweden) and J. Rajs. *Nord. Med.* 85(7):206-209, 1971.

5115 PANCREATIC NECROSIS COMPLICATED BY LEFT-SIDED PARANEPHRITIS AND FISTULA

OF THE COLON. (Rus.) Khelemendik, M. D. *Klin. Khir.* 51(2):61, 1971.

5116 THE RADIOLOGICAL DIAGNOSIS OF INFLAMMATORY AND TUMOROUS DISEASES OF THE PANCREAS. (Ger.) Heuck, F. (Katharine Hosp., Stuttgart, Germany), H. K. Deininger and H. V. Babo. *Z. Allgemeinmed.* 47(1):7-12, 1971.

5117 BLEEDING PANCREATICODUODENAL ARTERY ANEURYSM. (E.) Douglas, J. B. (St. George's Hosp., London), J. A. Gillespie and R. P. Wilding. *Br. J. Surg.* 58(5):397-398, 1971.

5118 PSEUDOCYST OF THE PANCREATIC TAIL REVEALING A NEOPLASM OF THE HEAD OF THE PANCREAS. (Rum.) Juvara, I. (Dr. I. Cantacuzino Hosp., Bucharest), A. Priscu and I. Vereanu. *Chirugia (Bucur.)* 19(12):1115-1122, 1970.

See also numbers: 4689, 4697

PANCREATITIS

5119 CHANGES IN URINARY AMYLASE EXCRETION IN NORMAL SUBJECTS AND IN PATIENTS WITH CHRONIC PANCREATITIS. (It.) Pera, A. (U. Turin Inst. Gen. Clin. Ther. Med., Italy), C. Sategna-Guidetti and A. Palmo. *Minerva Gastroenterol.* 16(4):147-150, 1970.

Urinary amylase activities were measured by Somogyi's method in 19 patients with chronic pancreatitis and in 79 normal controls; blood amylase activities were measured simultaneously in 17 controls and 13 patients with chronic pancreatitis. Wide variations in urinary activities were found in both groups, particularly in the patients, but the mean values were significantly higher in chronic pancreatitis. Only 1 control had an abnormally high urinary amylase value while 2 controls had elevated blood values. Blood amylase activities were within normal limits in 6 of 13 patients with pancreatitis while only 3 patients had normal urinary levels. In a patient with chronic calcifying pancreatitis who was studied for 28 days after onset of a recurrence, urinary amylase levels increased 3 days after onset and remained elevated during the entire period while blood amylase activities returned to normal after 25 days. From these findings it is concluded that urinary amylase determinations are useful in establishing a diagnosis of chronic pancreatitis, but both blood and urine levels should be measured. Increased values in 1 of these 2 tests are elevated in 90% of patients with chronic pancreatitis.

5120 ROUTE OF RETROGRADE FLOW IN THE EXOCRINE PANCREAS DURING DUCTAL HYPERTENSION. (E.) Bockman, D. E. (Med. Coll. Ohio, Toledo), W. R. Schiller and M. C. Anderson. *Arch. Surg.* 103(2):321-329, 1971.

Dense concentrations of ferritin, which had been infused into cannulated dog pancreatic ducts, were evident within some lobules, usually distributed around the periphery of individual acini. Electron microscopy revealed dense accumulations of ferritin at the base of some acinar cells. Unless obvious cell disruption occurred, it was unusual to find concentrations of ferritin anywhere other than the periacinar location. Disruption of the continuous epithelial lining of ducts and acini was observed at the ductoacinar junction, which may have accounted for access to the periacinar space. The periacinar space is bounded by the cell plasma membrane and the basal lamina of the acinar unit. This basal lamina appeared to permit diffusion of contents of the space into the interstitium where absorption occurred. When disruption of the plasma membrane occurred, zymogen granules were present in periacinar ferritin concentrations. At lower pressures (40 mm Hg as compared to 150 mm Hg) and longer infusions, ducts and the acinar lumens were dilated and focal areas of intracellular degeneration were more frequent. These changes may represent the earliest lesions of acute pancreatitis.

5121 SECRETIN-PANCREOZYMIN TEST. SEARCH FOR A SIGNIFICANT PARAMETER. (Fr.) van der Hoeden, R. (Chaussee de Vleurgat 244, Brussels, Belgium) A. Delcourt and P. Algoet. *Acta Gastroenterol. Belg.* 34(1):34-45, 1971.

The volume, amylase output, bicarbonate concentration, and bicarbonate output of duodenal juice were measured in 27 patients with pancreatitis, 19 patients with diseases of the biliary tract, and 20 controls. Measurements were made after injection of metoclopramide (10 mg i.m.) followed by administration of secretin (100 U i.v.) and, 30 min later, pancreozymin (100 I.U. i.v.). The bicarbonate output was by far the most reliable indicator of pancreatic insufficiency; it differed significantly from control values in 25 of 27 patients with pancreatitis. The 2 patients with normal bicarbonate outputs secreted abnormally large volumes of bile which diluted pancreatic secretion. All 4 parameters were normal in 16 of 19 patients with biliary tract diseases. The 3 exceptions were a cholecystectomized patient with lambliasis, a patient with polycholecystectomy syndrome and diabetes, and a patient with cholecystolithiasis and symptoms suggestive of pancreatic disease but a normal pancreas at surgery.

5122 EFFECT OF ENZYME INHIBITORS ON EXPERIMENTAL PANCREATITIS IN DOGS. (Ger.) Metzl, J. (City Hosp., Sopron, Hungary), A. Rádler, P. Schmidt and E. Gimes. *Z. Exp. Chir.* 4(2):107-114, 1971.

Acute edematous-hemorrhagic pancreatitis was induced in male and female dogs by the method of Hermann and Knowles; 10,000 U trasylol were administered i.v. immediately after surgery, and the dogs received 5000 U i.v. twice a day thereafter. Trasylol had no effect on the development of pancreatitis and did not increase survival times beyond those obtained in untreated controls, but these results may have been affected by the progressive jaundice which develops with this method. However, no better results were obtained by using a modification of Hermann and Knowles' method which obviates the development of jaundice and by administering larger doses of trasylol (25,000 U i.v. immediately after surgery and 25,000 U i.v. twice a day thereafter). These findings suggest that chronic biliary stasis is not the only factor which causes death; fluid and electrolyte losses and infections may also be involved.

5123 THE PANCREATIC SECRETION OF AMYLASE AS COMPARED TO THE AMYLASE CONCENTRATION IN THE INTESTINAL CONTENTS AFTER INGESTION OF A MEAL. (E.) Worning, H. (Glostrup Hosp., Coppenhagen, Denmark). *Scand. J. Gastroenterol.* 6(3):257-260, 1971.

Subjects consisted of 17 persons without signs or symptoms of pancreatic or any other gastrointestinal disorders, 27 patients with pancreatic diseases (3 with acute relapsing pancreatitis, 17 with chronic or chronic relapsing pancreatitis, 5 with pancreatic cancer, 2 with pseudocysts of the pancreas) and 10 patients with malabsorption syndromes (4 gluten enteropathy, 3 Crohn's disease, and 1 each with intestinal resection syndrome, carcinoid syndrome and mesenteric arterial insufficiency). In each subject a meal test and a secretin-pancreozymin test were performed. In no cases did the secretion rates differ with use of the Boots secreting from those with the GIH pancreozymin. Calculated curves indicated that the covariance of amylase concentration and amylase secretion was identical in the various groups and is expressed by the regression equation: $y= 0.0070x - 0.02$, where y is the secretion rate of amylase during content i.v. infusion of exogenous secretin plus pancreozymin (kilounits/min) and x is the mean concentration of amylase in the intestinal contents after ingestion of a meal (kilounits/liter). The correlation was 0.86.

5124 PANCREATIC PROBLEMS. II. CHRONIC PANCREATITIS AND PANCREATIC TUMORS. (E.) Zollinger, R. M. (Ohio State U. Coll. Med., Columbus). *Postgrad. Med.* 49(4):145-149, 1971.

5125 CHRONIC PANCREATITIS AFTER GASTRECTOMY FOR GASTRODUODENAL ULCER. (Fr.) Paris, J., A. Gerard and J. C. Paris. *Lille Med.* 15(9): 1230-1241, 1970.

5126 A NEW EFFECTIVE AND TECHNICALLY SIMPLIFIED METHOD FOR INDUCING EXPERIMENTAL ACUTE PANCREATITIS. (Bul.) Popivanov, I., K. Maimunkov and G. Zagurov. *Eksp. Med. Morfol.* 9(3):177-180, 1970.

5127 ANGIOPATHY IN THE COURSE OF CHRONIC PANCREATITIS. (Fr.) Sambin, P., R. Levrat and M. Girard. *J. Med. Lyon* 52(1205): 425-438, 1971.

5128 PANCREATITIS AND ATHEROSCLEROSIS: DEBATE ON PATHOGENESIS. (Fr.) Sambin, P., R. Levrat and M. Girard. *J. Med. Lyon* 52(1205): 441-453, 1971.

5129 PANCREATITIS WITH SALMONELLA GASTROENTERITIS. (E.) Scherl, N. D. (Englewood Hosp., N. J.) and D. L. H. Patterson. *J. Med. Soc. NJ* 68(2):129-130, 1971.

5130 ACUTE PANCREATITIS FOLLOWING GASTRIC RESECTION. (Rus.) Khoroshmanenko, N. I., L. A. Asliaiev and E. A. Lokaichuk. *Klin. Khir.* 51(2):30-33, 1971.

5131 ON THE MECHANISM OF THE THERAPEUTIC ACTION OF TRYPSIN INHIBITORS IN ACUTE PANCREATITIS. (Rus.) Sinovets, A. S., A. P. Levitskii and A. L. Veretennikov. *Klin. Khir.* 51(2):33-35, 1971.

5132 A CASE OF NEONATAL NECROTICOHEMORRHAGIC PANCREATITIS. (Fr.) Beaudoing, A. (CHU, Grenoble, France), J. Pont, J. Gachon and M. Dieterlen. *Pediatrie* 26(2):203-208, 1971.

5133 EARLY CHANGES IN PANCREATIC BLOOD FLOW AND EARLY VASCULAR PATHOLOGY IN BILE-INDUCED HEMORRHAGIC ACUTE PANCREATITIS. (Hun.) Varga, B. (Semmelweis Med. U., Budapest), G. Ungvary and P. Mallet Guy. *Orv. Hetil.* 112(9): 492-493, 1971.

5134 A STUDY ON MYCOTIC PANCREATITIS. (Ger.) Rohde, E. (Reg. Hosp., Rostock, Germany) and E. U. Schuhr. *Zentralbl. Allg. Pathol.* 114(2):153-158, 1971.

5135 ANGIOGRAPHY OF THE PANCREAS IN CHRONIC PANCREATITIS. (Rus.) Savchenko, A. P., V. A. Orlov, G. P. Filimonov and N. V. Ignatova. *Sov. Med.* 34(1):109-113, 1971.

5136 TWO AUTOPSY CASES OF CHRONIC PANCREATITIS. (Jap.) Kuroda, A. (Showa U. Med. Sch., Japan), M. Moriyama and M. Kanda. *J. Showa Med. Assoc.* 30(5):50-55, 1970.

5137 PANCREATITIS COMPLICATED BY PERICARDIAL EFFUSION AND CARDIAC TAMPONADE. RECOVERY AFTER PROLONGED CEREBRAL ANOXIA. (E.) Lipson, U. D. (U. Missouri Sch. Med., Columbia) and H. E. Stephenson, Jr. *Arch. Surg.* 103(3): 414-416, 1971.

See also numbers: 4624, 4690, 4700, 5314

5138 ABNORMAL STEROID HORMONE METABOLISM IN THE GENETIC LIVER DISEASE ACUTE INTERMITTENT PORPHYRIA. (E.) Kappas, A. (Rockefeller U., New York, N. Y.), H. L. Bradlow, P. N. Gilette and T. F. Gallagher. *Ann. NY Acad. Sci.* 179: 611-624, 1971.

The possibility that steroids are capable of regulating prophyrin-heme synthesis in the liver and may therefore be involved in the pathogenesis of acute intermittent porphyria (AIP) was studied. Detectable porphyrin-synthesis induction was found at a concentration of 10^{-8} M with a maximum nduction at 10^{-5} M for pregnanolone, pregnandiol, 17α-OH pregnanolone, pregnandione 11=0 pregnano-one, etiocholanolone, etiocholandione, and etiocholanolone-17β. These steroids, like drugs, stimulated hepatic porphyrin formation by enhancing the activity of the limiting enzyme δ-aminolevulinic acid (ALA) synthetase, as demonstrated in the whole-chick-embryo liver. All of these steroids share the basic steroid nucleus characteristic of 5β-H compounds. Steroids having the 5α-configuration had little or no porphyrin-nducing activity. Fifteen patients with acute ntermittent porphyria were found to have a defect in steroid biotransformation that resulted n the disproportionate metabolism of a prototype endogenous hormone by the 5β pathway. A marked deficiency of steroid Δ^4-5α-reductase activity was indicated in these patients. Patients with porphyria cutanea tarda did not seem to have this defect.

5139 THE LIVER IN ULCERATIVE COLITIS. (E.) Perrett, A. D. (Radcliffe Infirm., Oxford, England), G. Higgins, H. H. Johnston, G. R. Massarella, S. C. Truelove and R. Wright. *Q. J. Med.* 40(158):211-238, 1971.

The occurrence of liver disease and dysfunction n ulcerative colitis was studied in 300 patients by reviewing clinical, biochemical, bacteriological, histological, and immunological data. Fifteen percent (45 patients) had an abnormality in either the BSP retention test, SGPT or alkaline phosphatase, however, a considerable proportion of the liver biopsies taken from these patients showed no pathological changes. Of 13 biopsy specimens taken from patients with normal biochemical findings, 6 were entirely normal and 7 showed minor histological abnormalities. Cultures of liver tissue for bacteria and L forms were negative in all 45 cases in which they were taken. Twenty-five patients (12.7%) had a positive immunofluorescent test for human colon and 3.9% were positive for antinuclear factor, while 10.8% had positive tests for thyroglobulin antibodies. Minor pathological changes in the liver seem to be more frequent in ulcerative colitis than overt chronic liver disease.

5140 THE LIVER IN CROHN'S DISEASE. (E.) Perrett, A. D. (Radcliffe Infirm., Oxford, England), G. Higgins, H. H. Johnston, G. R. Massarella, S. C. Truelove and R. Wright. *Q. J. Med.* 40(158):187-209, 1971.

The occurrence of liver dysfunction and liver disease in Crohn's disease was studied in 100 patients by examining their clinical and laboratory data. Twenty six percent of the patients showed biochemical evidence of liver dysfunction, BSP retention being the most frequently abnormal (21 of 97 tests). While 2% had overt chronic liver disease, (one with hepatitis and one with portal cirrhosis associated with hemosiderosis) 18% exhibited a variety of less pathological changes in the liver. Of 39 patients who underwent successful liver biopsy, 8 had pericholangitis, 6 showed focal necrosis and 4 showed fatty change. In all patients, cultures of liver tissue for bacteria of L forms were negative. While immunologic studies showed no relation between liver dysfunction and Crohn's disease, positive immuno-fluorescence tests to human colon were found in almost 6 times as many patients with ulcerative colitis as with Crohn's disease (12.7% vs. 2.3%). While high IgM values were more frequent in ulcerative colitis, low levels were more frequent in Crohn's disease. The frequency of liver disease in Crohn's disease seems to be similar to that in ulcerative colitis.

5141 MALABSORPTION AND MEDICAL TREATMENT OF CHRONIC LIVER DISEASE IN CHILDREN. (Fr.) Weber, A. (U. Montreal St. Justine Hosp., Quebec, Canada) and C. C. Roy. *Union Med. Can.* 100(6):1171-1175, 1971.

The presence of ascites and failure of the prothrombin time to increase after administration of vitamin K were the only reliable criteria of liver decompensation in 23 children, aged 4 months to 17 yr. with chronic liver disease (14 with atresia of the extrahepatic biliary tract, 4 with atresia of the intrahepatic biliary tract, and 5 with postnecrotic cirrhosis). No correlation was found between the extent of liver failure or the severity of cirrhosis and serum albumin, bilirubin, transaminase, alkaline phosphatase, and cholesterol levels. No evidence of exocrine pancreatic failure of D-xylose malabsorption was found. Steatorhea, which was present in all 23 patients, was reduced by feeding a low-lipid diet to which medium-chain triglycerides had been added. Atresia of the extrahepatic biliary tract was associated with a high incidence of other anomalies including intestinal malrotation and umbilical and/or inguinal hernia. When patients with this condition became decompensated, ascites was initially controlled by diuretics, but complications such as marasmus, intercurrent infections, gastrointestinal hemorrhages, or blood clotting disorders, often resulted in death; only 1 patient died in hepatic coma. Liver transplants were unsuccessful in 4 patients. Patients with atresia of intrahepatic bile ducts had a much better prognosis: no signs of cirrhosis were present in 2 of 4 patients. Administration of medium-chain triglycerides and cholestyramine normalized prothrombin levels, pruritis disappeared, liver function improved, and the growth rate increased. The 5 patients with postnecrotic cirrhosis, all of whom had a history of neonatal hepatitis, had a better prognosis than patients with atresia of the extrahepatic biliary tract, but in some cases decompensation developed rapidly despite treatment.

5142 REACTIVE MESENCHYMAL CHANGES IN LIVER BIOPSIES FROM PATIENTS WITH LUNG DISEASES. (Ger.) Beckert, W. (Cent. Clin. Lung Dis. Tuberc., Bad Berka, Germany). *Dtsch. Z. Verdau. Stoffwechselkr.* 30(4):259-266, 1970.

Pronounced Kupffer cell activation was present in 310, periportal infiltrates in 160, and periportal fibrosis in 110 of 562 liver biopsies from patients with pulmonary tuberculosis (182), silicotuberculosis (88), extrathoracic tuberculosis (72), sarcoidosis (98), chronic nonspecific lung disease (101), and controls with nonpulmonary disease (37). Retothelial nodes occurred in 92 biopsies (16%) and were most common among patients with tuberculosis, sarcoidosis, and chronic nonspecific lung disease. Nonspecific hepatitis was diagnosed in 139 cases and was most prevalent in tuberculosis (28%) and sarcoidosis (28%). Tuberculous granulomas were present in 34 patients, only 12 of whom had hepatitis. Fatty liver, observed in 18 patients, was associated with hepatitis in 7. Liver cell necrosis occurred in 15 patients with tuberculosis, 1 with suppurative pneumonia, and 4 controls.

5143 COMPARISON OF TREATMENT IN FATTY LIVER. (Ger.) Sensing, H. (Med. Acad. Polyclin., Erfurt, Germany) and P. Scholtze. *Dtsch. Z. Verdau. Stoffwechselkr.* 30(4):267-273, 1970.

Of 63 patients (26 women and 37 men, aged 17 to 69 yr) with histological evidence of fatty liver, 16 received diet therapy alone; in addition, 15 received choline chloride (0.5 g/day), 18 received tolbutamide (1.5 g/day), and 16 received buformin (150 mg/day) for 9 months. Diet therapy alone significantly increased serum albumin levels, but no other significant changes occurred in liver function tests, clinical symptoms, or histological findings in any of these 4 groups of patients. No relation was established between histological signs of improvement and age, sex, or type of therapy.

5144 A STUDY OF THE VASCULAR CHANGES IN BILHARZIC HEPATIC FIBROSIS AND THEIR SIGNIFICANCE. (E.) Hidayat, M. A. (Cairo, Egypt) and H. A. Wahid. *Surg. Gynecol. Obstet.* 132(6):997-1004, 1971.

Biopsy material was obtained from patients with hepatosplenomegaly. In most patients, hepatic venograms, arteriograms, cholangiograms and splenic and portal venograms were made before or during surgery. Injection corrosion casts of the hepatic vasculature of normal dogs, normal human beings and bilharzic livers were prepared within 24 hr of death. In patients with bilharziasis, the portal venous tree showed obvious reduction of the portal bed due to widespread occlusion of its fine ramifications and narrowing of its large branches, with preservation of their normal pattern of division and distribution. The major portal branches were closely surrounded by an extensive network of minute, newly formed, thin-walled venous channels characteristically seen with presinusoidal hepatic fibrosis. The hepatic artery and its branches showed relative compensatory dilatation with patency of its fine fourth order branches, and this dilatation of the hepatic arterial bed increased the ratio of the hepatic arterial supply compared with the decreased portal blood flow, most of which bypassed the hepatic parenchyma by way of portasystemic collaterals. In contrast to the situation in cirrhotic livers, in bilharzic livers the hepatic veins and their tributaries retained their normal size, pattern of distribution and ramification without obvious stenosis, compression or displacement. In the bilharzic livers there was evidence of increased intrahepatic anastomoses between branches of hepatic artery, portal vein and hepatic veins.

5145 BUDD-CHIARI SYNDROME ASSOCIATED WITH OBSTRUCTION OF THE INFERIOR VENA CAVA. A REPORT OF SEVEN CASES. (E.) Takeuchi, J. (Kanazawa U. Sch. Med., Japan), A. Takada, Y. Hasumura, Y. Matsuda and F. Ikegami. *Am. J. Med.* 51(1):11-20, 1971.

Of 7 patients with idiopathic Budd-Chiari syndrome (1 with no hepatic vein obstruction, 2 with left hepatic vein obstruction and 4 with occlusion of both hepatic veins; Types A, B, and C, resp.) 6 showed membranous obstruction of the vena cava. Symptoms which were common to these patients included increased venous pressure in the lower limbs, abnormal BSF tests, hepatomegaly, edema, ascites and dilatation of the superficial veins. Abdominal pain and jaundice were rarely observed. Venography, venous pressures in the arm and leg, and liver biopsy were helpful in the diagnosis of inferior vena cava obstruction, however venous catheterization was the only method that demonstrated membranous obstruction. All patients with Type B occlusion survived, but all those with Type C occlusion (except for one with long obstruction of the vena cava, Type C') died, reflecting the poor prognosis with occlusion of all hepatic veins. In 2 patients with type B occlusion transcardiac membranotomy was performed resulting in the disappearance of the signs of the syndrome.

5146 DIFFERENTIATION OF LIVER CELLS CONTAINING IMMUNOGLOBULIN IN INFLAMMATORY DISEASES OF THE LIVER. (Ger.) Coburg, A. J. (Med. Tech. Inst., Hanover, Germany), E. Seifert and H. Deicher. *Acta Hepatosplenol. (Stuttg.)* 18(1):1-14, 1971.

Punch liver biopsies from 14 patients with acute hepatitis, 15 with chronic hepatitis, and 11 with cirrhosis were stained with fluorescein-labeled antisera to human immunoglobulin (Ig) G and IgM. An increased number of cells with specific fluorescence were present in almost all biopsies. Examination of these fluorescent cells under a phase-contrast microscope showed that about two thirds were macrophages and one third belonged to the plasma cell series. Some liver biopsies contained fluorescent Kupffer cells with either a granulated cytoplasm resembling the macrophages or a homogeneous cytoplasm like that in plasma cells; some biopsies also contained fluorescent parenchymal cells. No correlation was found between the number of fluorescent cells in the biopsies and either the extent of round cell infiltrates in the liver or the serum Ig level. No differences were found between the number of cells which contained IgG and the number of those containing IgM. These findings suggest that the liver itself does not take part in increased Ig synthesis in inflammatory liver diseases.

5147 AMMONIA PRODUCTION IN GERM-FREE ECK FISTULA DOGS. (E.) Nance, F. C. (Louisiana State U. Sch. Med., New Orleans), R. C. Batson and D. G. Kline. *Surgery* 70(2):169-174, 1971.

End-to-side portacaval shunts were performed upon conventional mongrels and axenic pure bred adult beagles. At least 10 days after surgery, ammonia absorption after a heavy protein challenge (40 ml/kg of human bank blood via orogastric tube) was measured in tranquilized axenic and conventional Eck fistula animals and in unshunted axenic animals. Over the next 2-9 hr, blood samples (peripheral venepuncture in conventional dogs and intracardiac puncture in axenic dogs) were withdrawn and levels of ammonia and blood urea nitrogen (BUN) were measured. All conventional animals whose shunt remained patent developed hyperammonemia, weight loss, lethargy and increased numbers of abnormal cerebral astrocytes. In this group, the mean fasting ammonia level was 270 µg%, the mean post-challenge peak was 391 µg% and the mean percent increase was 72%. There was also an approximate doubling of the mean peak BUN. All but one of the axenic dogs in whom the shunt remained patent developed hyperammonemia and weight loss. In shunted axenic dogs, the above parameters were 240 µg%, 382 µg% and 75%, while the resp. levels in unshunted axenic dogs were 120 µg%, 140 µg% and 28%. The rise in BUN in both axenic groups was approximately equal and both were similar to that in conventional dogs. Abnormal cerebral astrocytes were also found in shunted axenic dogs. There were no statistically significant differences in the measured parameters between conventional and axenic shunted dogs.

5148 PHYSIOLOGIC MEASUREMENT OF INTRAHEPATIC SHUNTED BLOOD FLOW BY MEANS OF D-GALACTOSE-1-C^{14}. (E.) Nakamura, T. (Tohoku U. Sch. Med., Sendai, Japan), S. Nakamura, T. Aikawa, O. Suzuki, A. Onodera and H. Iida. *Angiology* 22(6):344-353, 1970.

Intrahepatic shunted blood flow was measured in 109 patients with various liver disorders and 8 normal controls using D-galactose-1-^{14}C. The average intrahepatic shunts were 12% in controls, 14% in 6 patients with acute viral hepatitis, 28% in 35 patients with chronic hepatitis, 20% in 14 patients with presinusoidal portal hypertension, 51% in 25 patients with hepatic cirrhosis, 26% in 4 patients with primary hepatic carcinoma, and 38% in 10 patients with metastatic hepatic carcinoma. The correlation coefficient between the % intrahepatic shunt and the wedged hepatic venous pressure in patients with hepatic cirrhosis was +0.43 which was statistically significant. A significant correlation coefficient (+0.81) was also observed between the % intrahepatic shunt and the % of interstitial tissue in liver biopsies of cirrhotic patients. Thus, this type of measurement may be useful in the diagnosis of hepatic cirrhosis and hepatic fibrosis.

5149 HEPATIC LOBECTOMY. (E.) Mays, E. T. (U. Louisville Sch. Med., Ky.). *Arch. Surg.* 103(2):216-228, 1971.

Anatomical studies with the use of corrosion casts demonstrated the bisection of the human liver into a right and left lobe of nearly equal size by the portal vein, the hepatic artery and the bile ducts. The lobar fissure is a significant and safe line for transecting the liver. Ten left lateral segmental resections were reviewed with 17 lobectomies to elucidate differences between these 2 major resections. There were 12 deaths in the combined 27 patients, 3 deaths in the segmental group and 9 in the lobectomy group. The amount of blood required and the operative mortality was greater in the lobectomy group without prior hilar ligation than in the lobectomy with hilar ligation. During lobectomy, vascular isolation offered the best security in preventing exsanguinating hemorrhage. Resection of the lateral segment on the left was accompanied by little or no blood loss and was accomplished either by finger fracture with individual ligation or interlocking mattress sutures along the sagittal fossa. During lobectomy there was maintenance of inferior vena cava flow, operative decompression of the biliary system, and adequate external drainage. Liver mass was restored rapidly, the portal vein was progressively enlarged and after 2 yr small primitive arteries developed from the ligated lobar artery.

5150 MORPHOLOGIC CHANGES OF THE LIVER FOLLOWING SMALL INTESTINAL BYPASS FOR OBESITY. (E.) Shibata, H. R. (Roy. Victoria Hosp., Montreal, Quebec, Canada), J. R. Mackenzie and S. Huang. *Arch. Surg.* 103(2):229-237, 1971.

The effect of small intestinal bypass for obesity on hepatic structure and function in 10 patients over a period of 1-7 yr was evaluated. Liver function studies (alkaline phosphatase, LDH, SGOT, and BSP values) were within normal limits preoperatively, became abnormal immediately after operation, but gradually returned to normal levels within 6 to 12 months postoperatively. Serum cholesterol levels decreased by 40 to 50% and total serum protein levels were fairly well maintained by instructing patients to stay on a high protein diet. Apart from varying degrees of large nonmembrane-bound fat cysts in the hepatocytes in cases with marked fatty change, there were no ultrastructural differences to distinguish those patients with long-term bypass surgery up to 6 yr from those with restoration of normal intestinal continuity and with return of normal liver structure seen on light microscopy. Ultrastructural changes were characterized by fat accumulation and increase in liposome formation from granular endoplasmic reticulum.

5151 THE METABOLIC CHANGES AFTER PORTACAVAL SHUNT. (E.) Martini, G. A. (U. Marburg Med. Clin., Germany). *Acta Gastroenterol. Belg.* 34(2):216-231, 1971.

Several types of sequelae of portacaval shunting are discussed, all of which have a metabolic basis. Neuropsychiatric changes occur in 14-50% of patients (mean, 20%) and are considered the most severe and incapacitating, and depend on several factors including: type of cirrhosis, age, type of shunt, pre-shunt collaterals, general state of liver function, acute postoperative encephalopathy, duration of shunt and personality structure. The reversible acute disturbances consist of alterations of intellectual function and of the neuromuscular system. The chronic type is usually reversible with permanent intellectual deficits and continuous tremors of the Parkinsonian type and/or choreo-athetoid bizarre movements or cerebellar disturbances with ataxia. Morphologically there was a proliferation of pathological glial cells, especially in the olives, cerebellar nuclei, and medulla, subcortical medulla and basal ganglia. Basic metabolic changes consist of alterations in ammonia levels, acid-base and electrolyte balance, amines, carbohydrates, and fatty acids. Recently reported are cases of post-shunting excess deposition of iron in the liver and hepatogenous diabetes mellitus. Shunted patients showed an increased incidence of peptic ulcer disease (27%) in spite of the decreased levels of maximal gastric acid output both before and after shunting.

5152 PORTAL VENOUS GAS IN THE PEDIATRIC AGE GROUP. REVIEW OF THE LITERATURE AND REPORT OF TWELVE NEW CASES. (E.) Arnon, R. G. (Kings County Hosp., Brooklyn, N. Y.) and J. F. Fishbein. *J. Pediatr.* 79(2):255-259, 1971.

Twelve pediatric patients with portal venous gas are presented and 31 previously reported cases are reviewed. The characteristic radiographic appearance which was diagnostic was that of tubular lucencies branching from the porta hepatis to the edge of the liver. Portal venous gas is usually associated with gastroenteritis, necrotizing enterocolitis, sepsis and umbilical vein catheterization. The infants appeared critically ill, were acidotic, and were often in shock. Frequently, they presented with gastroenteritis, bloody stools, and a distended abdomen. In most of the cases there was underlying mucosal destruction observed at surgery and/or autopsy, however thepathogenesis remains unclear. Aside from cases secondary to umbilical catheterization, only 6 patients (14%) have survived.

5153 MICROBIOLOGICAL MONITORING OF PATIENTS IN HEPATIC FAILURE WITH PARTICULAR REFERENCE TO EXTRACORPOREAL PORCINE LIVER PERFUSION. (E.) Mummery, R. V. (Roy. Free Hosp., London), J. M. Bradley and D. J. Jeffries. *Lancet* 2(7715): 60-64, 1971.

The bacterial flora of 19 patients with acute hepatic failure was characterized, changes in the flora monitored, and, where possible, changes were related to operative procedures, antibiotic therapy, or alteration in the patient's condition. Of the 19 patients screened on admission, 8 patients retained a relatively normal gram-positive skin flora; 2 of these patients, however, developed more widespread carriage of Staphylococcus aureus as inpatients. Eleven patients were already colonized with gram-negative organisms to a variable degree on admission or developed such colonization within 24 hr of the start of antibiotic therapy. Bacteremia was demonstrated in 7 patients, 6 who did not receive antibiotic therapy retained their normal gram-negative skin flora, and 5 showed skin colonization while receiving antibiotic therapy. Potential pathogens were isolated from the inguinal region in 85% of these patients, thus the inguinal region seemingly should be avoided for intravenous catheterization for liver perfusion.

5154 INCIDENCE OF GALLBLADDER COMPLICATIONS IN CHRONIC INFLAMMATORY LIVER DISEASES. (Ger.) Selmair, H. (City Hosp. Med. Clin., Kassel, Germany) and D. S. Schmidt. *Z. Gastroenterol.* 9(2):79-86, 1971.

Gallbladder abnormalities were associated with chronic hepatitis in 1006 and with cirrhosis in

762 of 3515 randomly-selected, laparotomized patients. Cholelithiasis was present in 156 (15.5%) patients with chronic hepatitis and in 84 patients (11.0%) with cirrhosis. No relation was found between the severity or duration of the liver disease and abnormal gallbladder findings. In a group of 2538 randomly-selected autopsied patients, cholelithiasis was found in 567 (22.3%) cholecystitis without cholelithiasis in 30 (1.2%), and chronic liver disease in 188 (7.4%). Cirrhosis was the cause of death in 179 patients while 9 patients with chronic hepatitis died of other causes. Chronic cholelithiasis was present in 90 of the 188 patients (47.9%) with chronic liver disease. The ratio of males to females with chronic liver disease and cholelithiasis was 1:0.8. The χ^2-test showed that cholelithiasis is significantly more common among patients with chronic inflammatory liver diseases than among other patients.

5155 LIVER FUNCTION AND THE LIVER SCAN IN PATIENTS WITH POLYCYSTIC KIDNEY DISEASE. (E.) Oreopoulos, D. G. (Belfast City Hosp., Ireland), T. K. Bell and M. G. McGeown. *Br. J. Urol.* 43(3):273-276, 1971.

Liver function studies and liver scans were performed in 20 patients with polycystic kidney disease. In 13 patients the liver was not palpable, in 3 it was slightly enlarged and in the remaining 4 it was enlarged 4-6 cm below the costal margin. No significant change in liver function was observed in these patients. ^{198}Au scans showed the liver to be normal in size and shape in 10 patients, enlarged with filling defects suggestive of cysts in 6, and enlarged without definite cysts in 4.

5156 BUDD-CHIARI SYNDROME IN CHILDHOOD. A STUDY OF TWO PATIENTS. (E.) Hershko, C. (Hadassah U. Hosp., Jerusalem, Israel), E. Shapira, Y. Shvil, A. Polliack and A. Russell. *Isr. J. Med. Sci.* 7(4):592-597, 1971.

Two Arab children suffering from the Budd-Chiari syndrome, in one of whom diagnosis was established during life are presented. Both belonged to an ethnic group in which hepatic vein thrombosis seems to be an endemic or genetically determined disorder. The most striking clinical feature was ascites that developed acutely in one patient and in the second was probably of long duration culminating in a rapidly downhill final course. Occlusion of the inferior vena cava was demonstrated at autopsy in the former child and by angiography in the second. Lymphadenopathy was found in both. Both patients showed predominant enlargement of the left side of the liver, lack of anemia or leukopenia and well-preserved liver functions. Improvement was seen in the second patient following heparin therapy.

5157 CHOLESTEROL BIOSYNTHESIS IN TRANSPLANTABLE HEPATOMAS: EVIDENCE FOR IMPAIRMENT OF UPTAKE AND STORAGE OF DIETARY CHOLESTEROL. (E.) Harry, D. S. (Roy. Free Hosp., London), H. P. Morris and N. McIntyre. *J. Lipid. Res.* 12(3): 313-317, 1971.

Buffalo strain rats bearing Morris minimal deviation transplantable hepatomas (numbers 7793, 7794A and 7787), transplanted i.m. into the thighs bilaterally, served as experimental subjects and received a high cholesterol diet for up to 21 days. Incorporation of acetate into cholesterol by slices of the host liver was inhibited by this diet while incorporation of acetate by the tumor was unaffected. The esterified cholesterol content of the liver was far greater in cholesterol-fed rats than in control rats, but the free cholesterol of the liver showed little or no increase with cholesterol feeding. The cholesterol content of tumors was not increased in either the free or esterified forms. In the early period after intragastric administration of ^{3}H-cholesterol, the amount of label (in both free and esterified forms) in tumor tissue was much less than in the liver; after 96 hr, levels were similar in both tumor and liver, but this was due to a fall in liver levels and not to a rise in tumor levels. Hepatic labeling resulted from dietary uptake while tumor labeling was due to equilibration with blood ^{3}H-cholesterol.

5158 SIMULATED LIVER AUTOTRANSPLANTS. EXPERIMENTAL STUDY ON 20 DOGS. (Fr.) Depadt, G. (Sch. Med., Lille, France), J.-C. Laurent, J. Chevert, J.-C. Dumont, G. Lagache and M. Verhaeghe. *Lille Chir.* 25(4-5):191-199, 1970.

In 20 anesthetized dogs the liver was completely isolated except for the subhepatic and suprahepatic segments of the vena cava, the portal vein, and the hepatic artery, and the temperature of the liver was decreased to 11-15° C. The bile duct was mobilized and resected, and a cholecystoduodenal anastomosis was made. The hepatic artery and portal vein were dissected, perihepatic nerve plexi and periportal lymphatics were severed, a side-to-side mesenterocaval anastomosis was made to decompress the splanchnic system, and surgery was terminated with a femorojugular shunt. Of these 20 dogs, 4 died during surgery, 10 survived less than 48 hr, and 6 survived for 1 wk or more. Death was due to errors in technique in 5 dogs, to clotting disorders in 4, and to unrelated causes (peritonitis, intussusception, pulmonary complications) in 11. Clotting disorders developed in animals in which the liver was in a state of complete anoxia for 35-50 min. These disorders were prevented in later experiments by administration of coagulants or inhibitors of fibrinolysis. None of the surviving dogs developed jaundice or hyperbilirubinemia, but temporary increases occurred in serum alkaline phosphatase and SGPT activities which are attributed to liver trauma during surgery. Angiographic studies made on 1 dog who survived for 3 months showed no evidence of portal thrombosis, but a stricture was found at the site of the portocaval anastomosis.

5159 HEPATIC INVOLVEMENT IN THE COURSE OF ACQUIRED TOXOPLASMOSIS. (E.) Kouba, K. (Charles U. Infect. Dis. Clin., Prague), J. Jíra and D. Zitova. *Acta Paediatr. Scand.* 60(4): 482-487, 1971.

A single case is reported of a 5-yr-old girl with eosinophila, hepatosplenomegaly, diffuse adenopathy (bilaterally in the posterior cervical chains, axillae and inguinal regions), increased levels of serum glutamic oxaloacetic and pyruvic transaminases and laboratory evidence of recently acquired and active toxoplasmosis by toxoplasma antibody tests (both indrect fluorescent antibody and complement fixation).

5160 REVERSIBLE DISORDER OF LIVER FUNCTION IN PATIENTS WITH HYPERNEPHROMA. (Ger.) Linhart, P. (Univ. Med. Clin., Heidelberg, Germany), K. Heilmann and A. Weizel. *Dtsch. Med. Wochenschr.* 96(1):29-35, 1971.

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5198 FATTY LIVER DEVELOPMENT IN THE GOOSE: FAVORABLE EFFECT OF CHOLINE ENRICHED DIETS DURING THE PRECRAMMING PERIOD. (Fr.) Blum, J. C. (Tours Res. Ctr., Nouzilly, France) and B. Leclerq. *Ann. Zootechn.* 19(3):347-351, 1970.

5199 THE PORTAL VEIN IN DISEASES OF THE UPPER ABDOMINAL ORGANS OF THE CHILD. (Ger.) Wenz, W. (Univ. Surg. Clin., Heidelberg, Germany), H. Beckenbach and R. Daum. *Z. Kinderchir.* 9(3/4):354-362, 1971.

5200 RARE FINDINGS IN LAPAROSCOPY. (Ger.) Sensing, H. (Med. Acad. Polyclin., Erfurt, Germany). *Z. Gestamte Inn. Med.* 26(2): 74-78, 1971.

5201 WILSON'S DISEASE (HEPATOLENTICULAR DEGENERATION). TREATMENT WITH PENICILLAMINE AND CHANGES IN HEPATIC TRAPPING OF RADIOACTIVE COPPER. (E.) Goldstein, N. P. (Mayo Clin., Rochester, Minn.), W. N. Tauxe and J. T. McCall. *Arch. Neurol.* 24(5):391-400, 1971.

5202 LIVER SCINTIGRAPHY WITH ALBUMIN MACROAGGREGATES LABELED WITH 1131 FOR DIAGNOSIS OF HEPATIC TUMORS. (Fr.) Sicot, C. (Beaujon Hosp., Clichy, France), C. Moine and O. Hoanca. *J. Biol. Med. Nucl.* 6(23):28-33, 1971.

5203 A UNIQUE CASE OF AMEBIC ABSCESS OF THE LIVER. (E.) Cohen, M. B. (VA Hosp., Sepulveda, Calif.). *J. Nucl. Med.* 12(4):192-195, 1971.

5204 ACTIVITY OF SERUM MONOAMINE OXIDASE IN LIVER DISEASE. (Rus.) Gueller, L. I. and Z. P. Kozlova. *Lab. Delo* (1):48-49, 1971.

5205 HEPATOMA AND PELIOSIS HEPATITIS DEVELOPING IN A PATIENT WITH FANCONI'S ANEMIA. (E.) Bernstein, M. S. (U. Chicago, Pritzker Sch. Med., Ill.), R. L. Hunter and S. Yachnin. *N. Engl. J. Med.* 284(20):1135-1136, 1971.

5206 HEPATIC ABSCESS. ANALYSIS OF 18 CASES IN CHILDREN. (Sp.) Trejo Padilla, E. (Ninos J. M. de los Rios Hosp., Caracas, Venezuela), A. Mota Salazar, L. Martinez and A. Ocana Lopez. *Arch. Venez. Pueric.* 33(4):447-458, 1970.

5207 FORMATION OF STORAGE ELEMENTS IN LIVER CELLS IN LIPOMUCOPOLYSACCHARIDOSIS. (Ger.) Freitag, F. (U. Kiel Pathol. Inst., Germany), J. Spranger and S. Blumcke. *Verh. Dtsch. Ges. Pathol.* 54:(545-550), 1970.

5208 ULTRASTRUCTURAL STUDIES OF THE LIVER IN WILSON'S DISEASE. (Ger.) Rossner, J. A. (U. Heidelberg Pathol. Inst., Germany). *Verh. Dtsch. Ges. Pathol.* 54:537-544, 1970.

See also numbers: 4624, 4693, 4694, 4702, 4703, 4706, 4708, 4710, 4717, 4720, 5113

5209 POST-HALOTHANE JAUNDICE IN RELATION TO PREVIOUS ADMINISTRATION OF HALOTHANE. (E.) Mushin, W. W. (c/o K. Boddy, Scottish Res. Reactor Ctr., Glasgow), M. Rosen and E. V. Jones. *Br. Med. J.* 3(5765):18-25, 1971.

The pattern of administration of general anesthetics in a surgical population (441 patients) during the period in which halothane has been available was examined and compared with that in the cases of posthalothane jaundice previously reported to the Committee on Safety of Drugs (C.S.D.) and in the literature (141 patients). The data showed an "excess" of patients who had had repeated operations within short intervals of up to 4 weeks in the jaundiced groups, i.e. the cases in the C.S.D. and in the literature had a much higher proportion of short interval repeat halothane anesthetics than did the general population. Half (72) of the patients in the jaundiced group died. Extrapolation of the data indicated a risk of 1 in 6,000 to 1 in 22,000 in the case of repeat halothane anesthetics within 4 weeks. Thus, halothane anesthesia seemingly should be avoided in patients who have received it within the previous 4 weeks.

5210 SELECTIVE POTENTIATION OF CARBON TETRACHLORIDE HEPATOTOXICITY BY ETHANOL. (E.) Wei, E. (Stanford U. Dept. Physiol., Calif.), L. C. K. Wong and C. H. Hine. *Arch. Int. Pharmacodyn. Ther.* 189(1):5-11, 1971.

The interaction between ethanol and CCl_4 was studied in female rats and male mice. CCl_4 (0.05 ml/kg) significantly prolonged hexobarbital sleep time in rats but ethanol pretreatment neither potentiated this effect nor could it alone induce it. Chloroform (0.05 ml/kg) significantly prolonged pentobarbital sleep time in mice which was not potentiated by pretreatment with ethanol. Ethanol produced a dose-dependent potentiation of the SGPT response to CCl_4 in rats. Liver triglyceride was significantly elevated in rats given CCl_4 or both ethanol and CCl_4. Pretreatment with ethanol did not potentiate the liver triglyceride response to CCl_4.

5211 SYNTHETIC COMPOUNDS WITH TOXIC PROPERTIES SIMILAR TO THOSE OF PYRROLIZIDINE ALKALOIDS AND THEIR PYRROLIC METABOLITES. (E.) Mattlocks, A. R. (MRC Labs., Carshalton, Surrey, England). *Nature (Lond.)* 232(5311):476-477, 1971.

The toxic effects of unsaturated pyrrolizidine alkaloids were reproduced in rats by the administration of synthetic compounds. The most effective compounds were carbamate esters of 1-methyl-2,3-bis-hydroxymethyl-3-pyrroline. The N-ethyl carbamate diester was more toxic than the natural alkaloid monocrotaline. Most animals given doses of more than 60 mg/kg body weight i.p. or p.o. died 2-6 days later and had blood-stained ascites and massive hemorrhagic centrilobular liver necrosis. The analogous diacetyl and di-isovaleryl esters were not toxic to rats at much larger doses than the carbamate, and were not metabolized to significant amounts of pyrrole derivatives. The synthetic carbamate of retronecine exhibited toxicity to the rat greater than that of monocrotaline. i.v. injections of 5-12 mg/kg of 1-methyl-2,3-diacetoxymethyl pyrrole caused death after 20-35 days and produced changes in the lungs similar to those produced by monocrotaline pyrrole. Larger doses caused massive pleural effusions and death within a few days.

5212 OXYPHENISATIN AND LIVER DAMAGE. (E.) Willing, R. L. (Adelaide Hosp., Australia) and R. Hecker. *Med. J. Aust.* 1(22):1179-1182, 1971.

Six cases of liver damage associated with chronic oxyphenisatin ingestion are presented. In 2 of the patients, there was evidence of profound liver damage with gross hepatic fibrosis. All of the patients exhibited high serum bilirubin, transaminase and alkaline phospatase levels, and one of those who was biopsied showed histological findings of hepatocellular necrosis and lymphoid hyperplasia in varying amounts. No biopsies were taken on the other 3 patients. No proof of a relationship between dose and degree of liver damage was observed. Due to the possible hepatotoxic effect of this drug, commonly found in laxatives, it is suggested that this agent be removed from the market.

5213 STUDIES ON ACUTE METHIONINE TOXICITY. I. NUCLEOLAR DISAGGREGATION IN GUINEA PIG HEPATIC CELLS WITH METHIONINE OR ETHIONINE AND ITS REVERSAL WITH ADENINE. (E.) Shinozuka, H. (Temple U. Fels Res. Inst., Philadelphia, Pa.), L. W. Estes and E. Farber. *Am. J. Pathol.* 64(2): 241-256, 1971.

The comparative effects of excess methionine and of ethionine on the nucleolar fine structure of guinea pig hepatic cells was investigated to assess the role of ATP deficiency in the induction of nucleolar changes. Two hours after the injection of methionine (0.5 mg i.p.), a majority of the hepatic parenchymal cells began to lose their compact structure and showed disruption of nucleolonema. By 4 hr, almost all the parenchymal cells showed complete fragmentation while the nucleoli of biliary epithelial cells and Kupffer cells were not affected. Large aggregates of interchromatinic granules appeared in the nucleoplasm, these granules being smaller than granules of normal nucleoli and appearing in clusters.

These changes persisted until 10 hr after injection. When adenine sulfate was injected 4 hr after methionine and sacrifices were performed 4 hr later, many nucleoli no longer had any signs of fragmentation. Eight hours after ethionine injection, nucleolenema of hepatic cell nucleoli were disrupted and fragmented into small spherules. Changes in the chromatin pattern and aggregates of interchromateric granules were also present. The mechanism of nucleolar fragmentation following the administration of methionine or ethionine may be related to the accumulation of S-adenosyl compounds with concomitant ATP deficiency in the liver.

5214 ETHANOL-INDUCED FATTY LIVER: THE REQUIREMENT OF ETHANOL METABOLISM FOR THE DEVELOPMENT OF FATTY LIVER. (E.) Johnson, O. (U. Umea Dept. Chem., Sweden), O. Hernell, G. Fex and T. Olivecrona. *Life Sci.* [*II*] 10(10): 553-559, 1971.

The effect of ethanol (4 g/kg) and pyrazole (8 mmole/kg) on fat accumulation and the metabolism of serum free fatty acids when the rate of hepatic triglyceride accumulation is high, were studied in rats. Pyrazole decreased the rate of ethanol oxidation resulting in increased levels of blood ethanol; however, ethanol caused a 2.5 to 3-fold increase in the liver triglyceride content of treated rats within 6 hr after administration. In rats pretreated with pyrazole, however, ethanol had little effect on the triglyceride content. A higher percentage of injected labeled oleic acid was incorporated into liver neutral lipids in rats given ethanol than in the corresponding controls. This difference was much less in rats pretreated with pyrazole. Pyrazole may prevent the early rise in liver triglycerides by preventing the inhibition of fatty acid oxidation.

5215 IRON STORAGE IN ALCOHOLIC FATTY LIVER. (E.) Lundin, P. (Sahlgren's Hosp., Goteborg, Sweden), O. Lundvall and A. Weinfeld. *Acta Med. Scand.* 189(6):541-546, 1971.

Subjects consisted of 51 male alcoholics without hepatic cirrhosis, while controls consisted of 20 males admitted for elective cholecystectomy for uncomplicated gallbladder calculi. Liver biopsy was by percutaneous transthoracic puncture in the subjects and open biopsy at surgery in controls. In the controls, fatty liver was absent in 10, minimal in 4, and slight in 6, while in subjects it was absent in 5, minimal in 9, slight in 13, moderate in 9 and marked in 22. The mean alkali-soluble protein content of the liver in 47 alcoholics (44.8 g/100 g) and in the 21 alcoholics with no to slight fatty infiltration (51.1 g/100 g) were significantly less than in controls (56.1 g/100 g). In alcoholics, the protein content decreased in direct proportion to the increase in fatty infiltration. In controls, there was no significant relationship between protein concentration and liver fat. The mean hepatic iron concentration in alcoholics (68 mg/100 g) was significantly less than that in controls (104 mg/100 g, with no difference in relationship to fat); the mean liver iron in alcoholics with marked fat (62) was not significantly less than that in other alcoholics (73). There was no significant difference in liver iron concentration (mg/100 g protein) between alcoholics (148 ± 11 mg/100 g) and controls (186±21 mg/100 g). By histochemistry, there was no difference in hepatic visualization of iron in alcoholics and controls, and the amount of iron in hepatic parenchymal cells was not related to the degree of fatty infiltration.

5216 HALOTHANE AND LIVER NECROSIS. (E.) Kiriluk, L. B. *Am. Surg.* 37(8):482-484, 1971.

5217 PHOSPHOLIPIDS IN RAT LIVER IN THE COURSE OF CHRONIC CARBON TETRACHLORIDE INTOXICATION. (Ser.) Kostic, D. (Biochem. Inst., Belgrade, Yugoslavia), K. Kostic and M. Savic Cvetojevic. *Acta Med. Iugosl.* 24(3):203-207, 1970.

5218 ACUTE HEPATITIS DUE TO PARA-AMINOSALICYLIC ACID. (E.) Sochocky, S. (VA Ctr., Sioux Falls, S. Dak.) *Br. J. Clin. Pract.* 25(4):179-182, 1971.

5219 DRUGS AND THEIR ABUSE NO. VI - MISUSE OF DRUGS IN LIVER DISEASE. (E.) McCarthy, C. F. (Reg. Hosp., Galway, Ireland). *J. Ir. Med. Assoc.* 64(417):409-410, 1971.

See also number: 4659

5220 ATTEMPT TO DETECT AND PREVENT SERUM HEPATITIS. (Fr.) Heusghem, C. (U. Liege Lab. Med. Chem., Belgium), G. Plomteux, M. Otto-Servais, A. Andre, J. Brocteur, J. Buret, G. Mersch and G. Lennes. *Bull. Acad. R. Med. Belg.* 11(10):601-634, 1970.

SGPT, serum oxaloacetate-pyruvate transaminase, and serum ornithyl-carbamyl transferase activities, determined in blood from 5397 donors, showed that 145 (2.68%) had an enzyme pattern characteristic of viral hepatitis. Of 9 patients who received "suspect" blood, 5 developed significantly increased serum enzyme activities whereas 10 recipients of normal blood had no abnormalities in these serum enzyme levels during the 5-month observation period. Serum enzyme activities increased during the first 5 weeks after transfusion in 3 of 5 patients; in the other 2 patients increases occurred only 10 and 16 weeks, resp. after transfusion. No clinical symptoms of viral hepatitis developed in any of the 5 patients with increased serum enzyme activities.

5221 GLOMERULONEPHRITIS WITH DEPOSITION OF AUSTRALIA ANTIGEN-ANTIBODY COMPLEXES IN GLOMERULAR BASEMENT MEMBRANE. (E.) Combes, B. (U. Texas Southwestern Med. Sch., Dallas), J. Shorey, A. Barrera, P. Stastny, E. H. Eigenbrodt, A. R. Hull and N. W. Carter. *Lancet* 2(7718):234-237, 1971.

A single case is reported of a 53-yr-old male who developed hepatitis 4 months after receiving 4 units of whole blood. Despite prednisolone, his enzymes remained elevated and he was noticed to have pedal edema at 13 months and ascites at 16 months after initial diagnosis. At 18 months Australia antigen was detected in his serum and he was shown to have 4+ proteinuria. He was hospitalized 2 months later and his pertinent laboratory studies were normal, including an excretory urogram. Percutaneous renal biopsy revealed glomeruli of normal size with patent capillaries, focal mesangial hypercellularity and sclerosis, and diffuse thickening of glomerular capillary membranes. Electron microscopy revealed the characteristic changes of diffuse membranous glomerulonephritis. When cryostat sections of the kidney were studied by immunofluorescence, there were seen to be glomerular deposits of IgG, the third component of complement, C3, and Australia antigen in a pattern characteristic of immune complex deposition.

5222 THE ROLE OF LYSOSOMES IN THE PATHOGENESIS OF EXPERIMENTAL VIRAL HEPATITIS. (E.) Sabesin, S. M. (Jefferson Med. Coll., Philadelphia, Pa.). *Am. J. Gastroenterol.* 55(6):539-563, 1971.

The possible role of lysosomes in several phases of the mouse hepatitis replicative cycle were studied using a cell line (NCTC-1469) originally derived from mouse liver. Ultrastructural analysis disclosed uptake of the viral inoculum by phagocytosis followed by segregation of the inoculum into acid phosphatase-positive dense bodies. Following uptake into lysosomes, degradation of coat proteins occurred presumably by exposure to acid hydrolases contained within these organelles; however, these enzymes did not seem to inactivate the viral genome (RNA). A primary role of lysosomes in the initiation of viral cytopathic effects was not evident from ultrastructural studies. The first ultrastructural evidence of injury was the formation of small sequestered fragments of cytoplasmic matrix which became surrounded by smooth membranes and thus effectively isolated from the rest of the cell. The uptake of progeny virions by lysosomes following viral replication may have served to protect the cell from toxic effects of capsid proteins and provide a mechanism of viral release during cell lysis.

5223 THE INCIDENCE OF POSTTRANSFUSION HEPATITIS, AND THE LACK OF EFFICACY OF GAMMA GLOBULIN IN ITS PREVENTION. (E.) Spellberg, M. A. (Michael Reese Hosp., Chicago, Ill.) and P. M. Berman. *Am. J. Gastroenterol.* 55(5):564-574, 1971.

The incidence of posttransfusion hepatitis in patients hospitalized at Michael Reese Hospital and the effectiveness of γ-globulin in its prevention are reported. A total of 21% of the 100 patients in the study group developed hepatitis. Of the 53 patients that received γ-globulin in 2 10-ml doses 1 month apart, 12 developed hepatitis (22.6%). Nine of the 47 patients who did not receive γ-globulin developed hepatitis (19.1%). There was no difference between groups regarding frequency of icteric hepatitis incidence. It seems that γ-globulin is ineffective in the prevention of posttransfusion hepatitis.

5224 DEVELOPMENT AND PERSISTENCE OF ANTIBODY TO HEPATITIS-ASSOCIATED (AUSTRALIA) ANTIGEN IN PATIENTS WITH HEMOPHILIA. (E.) Seeler, R. A. and M. A. Mufson (Cook County Hosp., Chicago, Ill.). *J. Infect. Dis.* 123(3): 279-283, 1971.

Serum from 54 persons with hemophilia, each transfused on at least 2 occasions, was examined for hepatitis-associated (Australia) antigen (HAA) and antibody (aHAA) to this antigen to determine if injection with hepatitis-containing materials would alter the reactivity to infused antihemophiliac factor (AHF). Eight of 41 individuals who lacked inhibitor were aHAA-positive while 6 patients were anticomplementary. None of 7 inhibitor-positive hemophiliacs who lacked AHF were aHAA-positive. Two samples of inhibitor-negative plasma positive for aHAA did not neutralize AHF anticoagulant, suggesting that detection of aHAA was not masked by the presence of inhibitor. None of the hemophiliacs developed hepatitis and HAA was not detected in serum or plasma from the 40 aHAA-negative patients.

5225 RELATIONSHIP OF HEPATITIS-ASSOCIATED ANTIGEN (H.A.A.) TO ACUTE AND CHRONIC LIVER INJURY. (E.) (Roy. Free Hosp., London), R. A. Fox and S. Sherlock. *Lancet* 2(7714):1-3, 1971.

Hepatitis-associated antigen (HAA) titers and serum third component of complement (C_3) were measured in 87 patients with HAA in their serum and in 18 patients with massive liver necrosis. HAA titers were highest in carriers and lowest in those patients with chronic aggressive hepatitis, indicating an inverse relationship between the HAA titer and the severity of hepatocyte injury. The lowest titers were observed in HAA-positive patients with fulminant hepatitis. There was no correlation between the serum third component of complement and hepatocyte injury in hepatitis patients; however, each of the 18 patients with massive necrosis had hypercomplementemia. There was no difference in serum C_3 levels between the patients with liver disease of viral etiology and those with disease of drug etiology. Thus, the clinical course of HAA-positive patients may be related to variations in the patients' cellular immune response to HAA.

5226 FUNCTIONAL INVOLVEMENT OF THE PANCREAS IN VIRAL HEPATITIS. (STUDY OF 45 CASES). (Fr.) Laverdant, C. (Val-de-Grace Hosp., Paris), J. Meunier, C. Molinie and A. Baudet. *Ann. Med. Interne (Paris)* 122(3):343-352, 1971.

The volume of pancreatic juice and bicarbonate output during the first 30 min after injection of secretin (3 U/kg/hr) were measured in 25 patients with acute viral hepatitis, 6 patients with recurrent hepatitis, and 14 patients with persistent forms of the disease. Immediately after the development of jaundice pancreatic secretion was decreased significantly in 36 of these 45 patients (80%) and was still decreased after clinical recovery in 32-36%. Pancreatic secretion was decreased in 78.5% of the patients with persistent hepatitis at onset and in 42.8% after 4-5 months, but was not significantly decreased after 9-12 months. Biocarbonate output was decreased in 26 of these 45 patients (57.8%) at onset, however, only 4% of patients with acute hepatitis had decreased bicarbonate outputs at onset and 1 of these 25 patients had bicarbonate hypersecretion. Bicarbonate outputs normalized after 9 months in all patients including those with persistent hepatitis.

5227 THE PROGNOSIS FOR SEVERE VIRAL HEPATITIS. (Fr.) Rueff, B. (Beaujon Hosp., Clichy, France), C. Sicot, J.-P. Benhamou and R. Fauvert. *Ann. Med. Interne (Paris)* 122(3):373-380, 1971.

Blood clotting disorders (Quick times of less than 50% in 75 patients) and hepatic encephalopathy were found in 77 patients with severe viral hepatitis. Symptomatic treatment (glucose infusions, plasma and blood, antibiotics and, when necessary, artificial respiration) was given to 56 patients; in addition, 21 patients received corticosteroids (11), autotransfusions (8), hyperbaric oxygen (2), and cross circulation (2). Of these 77 patients, 18 regained consciousness, but 5 of the 18 subsequently died of acute liver failure (3 patients), septicemia (1 patient), and intracranial hypertension (1 patient). Of the 13 who recovered after symptomatic treatment, 1 died of a myocardial infarction 1 month later, and 2 still had hepatomegaly but no evidence of cirrhosis 6 months later; 10 patients recovered completely. The following signs were significantly more common or pronounced among patients who died: signs of liver atrophy, convulsions, spontaneous rolling of the arms, history of serum hepatitis, high blood ammonia levels, increased Quick time, and deficiency of clotting factor V. However, many of these signs were also observed in patients who recovered.

5228 HAEMODIALYSIS-ASSOCIATED HEPATITIS. (E.) Finn, R. (Sefton Gen. Hosp., Liverpool, England). *Postgrad. Med. J.* 47(549):499-500, 1971.

5229 THE PREVENTION OF HEPATITIS IN HAEMODIALYSIS UNITS. (E.) Polakoff, S. (Cent. Public Health Lab., London). *Postgrad. Med. J.* 47(549):501-503, 1971.

5230 TYPHOID HEPATITIS. (Sp.) Link, A., M. Gabor, E. Caballero and E. Cassorla. *Rev. Chil. Pediatr.* 41(8):831-834, 1970.

5231 INFECTIOUS HEPATITIS IN BRISTOL, 1959-1970. (E.) Skone, J. F. (Bristol, England). *Postgrad. Med. J.* 47(549):462-464, 1971.

5232 SOME ASPECTS OF THE EPIDEMIOLOGY OF HEPATITIS IN SWEDEN. (E.) Ringertz, O. (State Bacteriol. Lab., Stockholm, Sweden). *Postgrad. Med. J.* 47(549):465-472, 1970.

5233 VIRAL HEPATITIS IN DRUG ADDICTS. (E.) Sullman, S. F. and A. J. Zuckerman (London Sch. Hyg. Trop. Med.). *Postgrad. Med. J.* 47(549):473-475, 1971.

5234 PREVENTION OF HEPATITIS WITH IMMUNOGLOBULIN. (E.) Reid, D. (Ruchill Hosp., Glasgow, Scotland). *Postgrad. Med. J.* 47(549): 488-489, 1971.

5235 THE MULTIPLE AETIOLOGY OF VIRAL HEPATITIS. (E.) Zuckerman, A. J. (London Sch. Hyg. Trop. Med.). *Postgrad. Med. J.* 47(549):476-480, 1971.

5236 A REVIEW OF THE PRESENT POSITION OF AUSTRALIA ANTIGEN. (E.) McCallum, F. O. (Radcliffe Infirm., Oxford, England). *Postgrad. Med. J.* 47(549):481-483, 1971.

5237 TREATMENT OF COMAS CAUSED BY VIRAL HEPATITIS. (Fr.) Bertrand, L. (St. Eloi Hosp., Montpellier, France). *Ann. Gastroenterol. Hepatol. (Paris)* 7(4):379-395, 1971.

5238 CHRONIC LOCALIZED NONPROGRESSIVE VACCINIA DURING INFECTIOUS HEPATITIS. (E.) Taylor, W. F. (U. California Coll. Med., Irvine), B. Y. Quaqundah and J. R. Black. *Am. J. Dis. Child.* 121(5):420-422, 1971.

5239 AUSTRALIAN ANTIGEN AND VIRAL HEPATITIS. (It.) Monacelli, M. (U. Rome Infect. Dis. Clin.), V. Lacava, T. Altieri and C. De Bac. *Aggiorn. Pediatr.* 21(1):1-14, 1970.

5240 A COMPARATIVE STUDY OF SOME GLYCOPROTEIN COMPONENTS. I. INVESTIGATIONS ON INFECTIOUS HEPATITIS. (Rum.) Bukaresti, L. (Inst. Pharm. Med., Tirgu Mures, Rumania), G. Siko and I. N. Csiki. *Rev. Med. (Tirgu Mures)* 16(3-4):286-290, 1970.

5241 OBSERVATIONS IN CONNECTION WITH THE PROGNOSIS OF DIFFUSE HEPATIC NECROSIS DURING VIRAL HEPATITIS. (Rum.) Szekely, P. (Infect. Dis. Clin., Tirgu Mures, Rumania), L. Kasza and A. Palenosar. *Rev. Med. (Tirgu Mures)* 16(3-4):332-336, 1970.

5242 EPIDEMIOLOGIC INVESTIGATIONS ON INFECTIOUS HEPATITIS AS AN OCCUPATIONAL DISEASE. (Ger.) Krieg, D. (Inn. Abt. Verein. Gesundh. Inricht., Eisenhuttenstadt, Germany). *Dtsch. Gesundheitsw* 26(7):296-299, 1971.

5243 AN ANALYSIS OF ANTIBODY RESPONSE TO AUSTRALIA ANTIGEN IN MAN. (E.) Greenberg, H. B. (Columbia U. Coll. Physicians Surg., New York, N. Y.) and D. J. Gocke. *J. Infect. Dis.* 123(4):356-364, 1971.

5244 VIRAL HEPATITIS AND AUSTRALIA ANTIGEN. (E.) Krugman, S. (New York U. Sch. Med., N. Y.). *J. Pediatr.* 78(5):887-891, 1971.

5245 DIAGNOSIS OF INFECTIOUS HEPATITIS IN GENERAL PRACTICE. (E.) Goldberg, D. M. (Roy. Hosp., Sheffield, England). *Lancet* 1(7700):641-643, 1971.

5246 FAILURE OF AUSTRALIA ANTIBODY TO PREVENT INFECTIOUS HEPATITIS. (E.) Hawkes, R. A. (Prince Henry Hosp., Sydney, Australia). *Med. J. Aust.* 1(7):390-392, 1971.

5247 MORPHOLOGY AND IMMUNOLOGICAL PROPERTIES OF AUSTRALIA/SH ANTIGEN IN HEPATITIS. (E.) Cossart, Y. E. (Cent. Public Health Lab., London), A. M. Field, F. D. Hargreaves and A. A. Porter. *Microbios* 3(9):5-14, 1971.

5248 CLINICAL AND EPIDEMIOLOGIC FEATURES OF VIRAL HEPATITIS UNDER CONDITIONS OF MASS PROPHYLAXIS WITH GAMMAGLOBULIN. (Rus.) Shatrov, I. I., I. N. Mastiukova and G. V. Ignatieva. *Mikrobiologiia (Mosk.)* 40(5):11-14, 1971.

5249 POSTTRANSFUSION VIRAL HEPATITIS AND THE HEPATITIS ASSOCIATED ANTIGEN (HAA). (E.) Holzbach, R. T. (Case Western Reserve U. Sch. Med., Cleveland, Ohio) and M. A. Leon. *Ohio State Med. J.* 67(4):329-332, 1971.

5250 LIABILITY FOR POSTTRANSFUSION HEPATITIS. (E.) Maas, A. E. (Harrisburg Polyclin. Hosp., Pa.). *Penn. Med.* 74(3):36-37, 1971.

5251 VIRAL HEPATITIS AND PANMYELOPATHY. (Hun.) Zulik, R. and F. Bako. *Orv. Hetil.* 112(14):803-805, 1971.

5252 LABORATORY DIAGNOSTIC AND NEEDLE BIOPSY HISTOLOGY OF THE LIVER IN INFECTIOUS HEPATITIS. (Ger.) Eberle, J. (Reg. Hosp., Plauen, Germany) and R. Seidel. *Z. Aerztl. Fortbild. (Jena)* 65(5):248-250, 1971.

5253 STABILITY OF THE LIPID AND PROTEIN OF HEPATITIS ASSOCIATED AUSTRALIA ANTIGEN. (E.) Kim, C. Y. (City Hosp., Boston, Mass.) and D. M. Bissell. *J. Infect. Dis.* 123(5):470-476, 1971.

See also numbers: 4691, 4721, 5255

5254 DIAGNOSIS AND TREATMENT OF CHRONIC HEPATITIS. (Sp.) Andreu Kern, F. (Social Security City Sanitar., Seville, Spain), J. Carneado, J. De La Santa, J. Aguilar and J. M. Loizaga. *Rev. Esp. Enferm. Apar. Dig.* 33(6): 675-686, 1971.

On the basis of histories, clinical symptoms, liver function tests, laparoscopy findings, and liver biopsies, 12 patients (9 males and 3 females, aged 8-51 yr) were diagnosed as having chronic hepatitis. A history of jaundice dating back 3 months to 14 yr was elicited from 12 patients; 2 patients had serum hepatitis 2 had brucellosis, 1 had diabetes, 1 had been treated with large doses of sedatives, and 1 had a hepatic precoma during an acute episode of hepatitis. The most consistent findings were positive urinary urobilin, normal total bilirubin, BSP retention, and increased serum transaminase activities; none of these patients had a positive test for lupus erythematosus. Laparoscopy showed that 3 patients had acute hepatitis, 9 had chronic hepatitis, and 2 had cirrhosis; only 1 patient was an alcoholic. Aggressive forms of chronic hepatitis, diagnosed in 5 patients, were treated with azathioprin (200 mg/day) until serum transaminase activities normalized; maintenance doses of 100 mg/day were then administered for at least 1 yr.

5255 PERSISTENT VIRAL HEPATITIS: HISTOLOGICAL ASPECTS OF ITS DEVELOPMENT. (Fr.) Chastel, C. (Army Training Hosp., Marseille, France), A. Bezon and J. Bereni. *Arch. Anat. Pathol. (Paris)* 19(1):31-38, 1971.

Repeated punch biopsies of the liver, performed on 147 army personnel who had contracted viral hepatitis, probably type A, revealed that none of these patients developed chronic hepatitis. Although histological changes persisted for more than 3 months in 40% of these patients and for more than 1 yr in 6 patients, all but 3 patients, who eventually developed cirrhosis, recovered. In some patients with persistent lesions portal infiltration developed into portal fibrosis, the walls of the centrilobular vein became thickened with collagen, and diffuse liver cell damage and steatosis persisted. The development of steatosis was not related to corticosteroid therapy. The most characteristic features of persistent hepatitis, however, were micronodules of histiocytes and diffuse eosinophilic necrosis, the extent of which was roughly proportional to increases in SGPT activities. It is recommended that the term "chronic hepatitis" be replaced by "persistent viral hepatitis".

5256 CONTROLLED PROSPECTIVE TRIAL OF CORTICOSTEROID THERAPY IN ACTIVE CHRONIC HEPATITIS. (E.) Cook, G. C. (U. Zambia Dept. Med., Lusaka), R. Mulligan and S. Sherlock. *Q. J. Med.* 40(158):159-185, 1971.

The effectiveness of long-term corticosteroid (prednisolone) therapy in the treatment of active chronic hepatitis was studied in 49 patients including 27 controls. Mean serum bilirubin, total globulin and albumin levels in the 22 patients receiving corticosteroid (15 mg daily) showed a significant trend toward normal during the first 2 to 3 yr of therapy when compared with the control group. The mortality rates after 3 yr for the corticosteroid group and controls were 13.6% and 55.5%, resp. All 3 deaths in the former group and 13 of the 15 in the control group were the result of hepatic failure. In some patients receiving corticosteroid therapy, the daily dosage was reduced as liver function tests became normal and was subsequently discontinued in 8 patients. Four patients had serious side effects due to the prednisolone while several others had minor complications. For the survivors, the mean time from entry into the study until this assessment was 53.3 months and 52.2 months for the therapy and control groups, resp. Corticosteroid therapy seems to be effective in increasing life expectancy when administered during the early active phase of active chronic hepatitis.

5257 AUSTRALIA ANTIGEN: A GENETIC BASIS FOR CHRONIC LIVER DISEASE AND HEPATOMA. (E.) Sutnick, A. I. (Inst. Cancer Res., Philadelphia, Pa.), W. T. London and B. S. Blumberg. *Ann. Intern. Med.* 74(3):442-444, 1971.

5258 CHRONIC HEPATITIS - CONCEPTS AND PATHOGENESIS. (E.) De Groote, J. (St. Rafael Acad. Hosp., Louvain, Belgium). *Tijdschr. Gastronterol.* 13(6):449-458, 1971.

5259 SANATORIUM TREATMENT OF CHILDREN WITH CHRONIC HEPATITIS. (Rus.) Golsand, I. V., M. A. Bernshtam and V. A. Kulaeva. *Sov. Med.* 34(1):93-96, 1971.

5260 IMMUNOSUPPRESSION WITH CYCLOPHOSPHAMIDE IN CHRONIC PROGRESSIVE HEPATITIS IN A 12 YEAR OLD GIRL. (Pol.) Rabenda, C. (Med. Acad. Clin. Infect. Dis. Child., Wroclaw, Poland) and Z. Rudkowski. *Pediatr. Pol.* 46(3):357-359, 1971.

5261 THE VOCABULARY OF CHRONIC HEPATITIS. (E.) Popper, H. and F. Schaffner. *N. Engl. J. Med.* 284(20):1154-1156, 1971.

See also numbers: 4698, 5225

262 STUDIES OF MALE CIRRHOTICS WITH
LABELED ESTRADIOL. (Ger.) Altenburg,
. (U. Hamburg 1st Med. Clin., Germany) and K.
ecker. *Acta Hepatosplenol. (Stuttg.)* 18(2):
5-103, 1971.

lasma activities of estradiol were measured in
5 male patients with cirrhosis confirmed by
iopsy or laparoscopy and in 18 controls after
njection of 17β-6,7-^{3}H-labeled estradiol (50
C); 67% of the cirrhotics had female hair pat-
erns, 20% had gynecomastia, 26% had testicular
trophy, 73% had spider nevi, 60% had palmar
rythema, and 3 patients had diabetes mellitus.
o differences were found between half-lives
easured on cirrhotics and those measured on
ontrols. These results and the findings of a
revious study on urinary excretion of estradiol
uggest that the distribution and excretion of
stradiol can be explained by a 2-compartment
odel. In cirrhotics there was a tendency for
alf-lives to decrease with increasing albumin
evels, indicating some relation exists between
lasma clearance and liver function, but this
elation was not statistically significant.
ecause the calculated plasma clearance rate for
stradiol was faster than known values of liver
lood flow, estradiol may be excreted by other
rgans than the liver. Since estrogen conjuga-
ion has been found to occur in the intestinal
ucosa in cirrhotics, it is possible that the
ntestinal mucosa could compensate for distur-
ances in estrogen metabolism in the liver.

263 ZINC CONTENT OF THE LIVER AND URINE
IN CIRRHOSIS. (Ger.) Kallai, L.
Univ. Med. Clin., Zagreb, Yugoslavia), M.
eler-Bačoka, A. Stojanovski-Bubanj, M. Koršić,
. Knežević and N. Hadžić. *Schweiz. Med.*
ochenschr. 101(18):643-646, 1971.

tudent's t-test revealed that serum zinc con-
entrations were significantly lower in 46 patients
ith decompensated alcoholic cirrhosis (9.0-84.3
g/100 ml) than in 32 normal controls (47-100.3
g/100 ml). In 24-hr urine samples the zinc con-
ent ranged from 0-1836 μg in 45 of these cirrho-
ics and from 0-864 μg in the controls; increases
n the zinc content were of borderline significance
n cirrhotics. A correlation between decreased
erum zinc levels and increased urinary zinc
xcretion was only found in a few of the cirrhotics.
lthough normalization of serum zinc levels was
ccompanied by clinical improvement and decreases
n serum zinc levels by worsening in some
atients, this was not observed consistently.
ince decreased serum zinc concentrations have
een found in patients with other liver diseases
nd since urinary zinc excretion varies so greatly,
hese tests are of no value for differential
iagnosis or prognosis in decompensated alcoholic
irrhosis.

5264 ^{14}C-BILIRUBIN CLEARANCE IN CIRRHOSIS. (Ger.) Schmidt, M. (GSF Inst. Hematol., Munich, Germany), J. Eisenburg and W. Stich. *Klin. Wochenschr.* 49(6):345-348, 1971.

Studies made after i.v. injection of ^{14}C-bilirubin (0.05 μC) into 15 patients with moderately severe to severe cirrhosis showed that bilirubin uptake and conjugation in the liver were impaired. The decrease in bilirubin uptake may be partially due to decreased circulation and parenchymal destruction in the cirrhotic liver which is accompanied by a decrease in functioning liver cells. This decrease may also be caused by difficulties for bilirubin to pass from sinus blood across the thickened wall of the sinus into liver cells or by impairment of exchange resulting from the development of several layers of liver cells. Decreased bilirubin uptake causes a decrease in the rate of bilirubin conjugation, but conjugation was even more impaired than uptake. A rough correlation was established between the severity of cirrhosis and the half-life for bilirubin conjugation. No correlations were found between the size of the liver, the duration of cirrhosis, and half-times for bilirubin uptake and conjugation.

5265 AUTOPERFUSION OF ASCITES FLUID IN CIRRHOSIS: EFFECTS ON WATER, SODIUM, AND POTASSIUM EXCRETION. (Fr.) Fabre, S. (Sch. Med., Dakar, Senegal). *Sem. Hop. Paris* 47(22): 1426-1431, 1971.

Ascites fluid, taken from 10 patients with cirrhosis, portal hypertension and, in some cases, bleeding from esophageal varices, was reinfused into the femoral or subclavian vein. Most of these patients were infused after failure of diuretic therapy or repeated abdominal paracentesis. Infusions of ascites fluid (500-1000 ml/hr for 9-72 hr) increased diuresis 2.5-25 times and increased sodium excretion in all but one patient but had relatively little effect on potassium excretion. Except for one patient who developed gastrointestinal bleeding, infusions of ascites fluid were well tolerated. It is suggested that both changes in renal hemodynamics and increased glomerular filtration caused increased sodium excretion.

5266 METABOLISM OF FIBRINOGEN IN CIRRHOSIS OF THE LIVER. (E.) Tytgat, G. N. (U. Leuven Dept. Med., Belgium), D. Collen and M. Verstraete. *J. Clin. Invest.* 50(8):1690-1701, 1971.

The metabolism of radioactive iodine labeled fibrinogen was analyzed in 50 patients with hepatic cirrhosis, and the effect of inhibition of the coagulation system by heparin and the inhibition of the fibrinolytic system by tranexamic acid on the turnover of labeled fibrinogen were studied in 10 and 17 patients, resp. No significant differences were observed between patients with cirrhosis and healthy controls with regard to plasma fibrinogen concentration and total plasma fibrinogen pool. Cirrhotics exhibited greater plasma volume (47 versus 42 ml/kg), shorter fibrinogen half-life (2.99 versus 4.14 days), lower fractional (0.34 versus 0.24 of plasma pool/day) and catabolic rates (39 versus 28 mg/kg/day), and high transcapillary efflux rate (0.82 versus 0.60 of plasma pool/day). Heparinization of cirrhotics was associated with a prolonged fibrinogen half-life (from 3.15 ± 0.69 to 4.59 ± 0.79 days) and a rise in plasma fibrinogen in 6 or 8 cases. Treatment with tranexamic acid (trans-4-aminomethyl cyclohexane-1-carboxylic acid) had no significant effect on plasma radioactivity half-life. Accelerated fibrinogen consumption may occur by a process of disseminated intravascular coagulation in hepatic cirrhosis.

5267 ARTERIOGRAPHY IN CIRRHOSIS: STATISTICAL STUDY OF ARTERIAL CALIBER. HYPERTROPHY AND ATROPHY. 18 CASES. (Fr.) Gauthier, A.-P. (INSERM Unit. Res. Dig. Pathol., Marseille, France), H. Piétri, F. Lauret, Y. Capitaine and R. S. Thiago-Fernandez. *Arch. Fr. Mal. App. Dig.* 60(1-2):27-38, 1971.

Diameters of the hepatic arteries, their branches, the splenic artery and the dimensions of the spleen were measured in 18 patients with alcoholic cirrhosis (including 1 patient with adenocarcinoma and cirrhosis) and in 47 subjects with no liver disease by selective celiomesenteric arteriography. In cirrhotics analysis of variance revealed significant increases in the mean diameter of the proper hepatic artery, right hepatic artery, and branches from the third and fourth divisions and terminal branches of the right hepatic artery. The size of the spleen was significantly increased in cirrhotics, but the mean diameter of the common hepatic and left hepatic arteries did not differ significantly from control values. Liver atrophy was more likely to be associated with increases in the diameter of the hepatic arteries than was liver hypertrophy, but increased, decreased, and normal diameters were found in both hypertrophy and atrophy.

5268 CIRRHOSIS OF THE LIVER IN IRAN. A PROSPECTIVE STUDY ON 66 CASES. (E.) Borhanmanesh, F. (Pahlavi U. Dept. Med., Iran), A. Ghavami, W. Dut and S. Bagheri. *J. Chronic Dis.* 23(12):891-905, 1971.

Sixty six cases of hepatic cirrhosis observed at the Pahlavi University Medical Center in Iran over a 2-yr period are reviewed. The mortality rate during the observation period was 33% (22 patients), and 17 autopsies were performed and tissue diagnoses were made in 60 patients. On the average, these patients were 20 yr younger (30-39 years) than those reported in Western countries. Splenomegaly, massive ascites and a variety of herniations were the main clinical findings. There was a significantly decreased incidence of palmar erythema, clubbing of the fingers, parotid enlargement of Dupuytren's contracture. Microscopic examination revealed postnecrotic cirrhosis in 43 cases and posthepatic cirrhosis in 8 cases. Adequate tissue for pathological classification was available in only 51 cases. Liver function studies were better in those patients with posthepatic cirrhosis. Malnutrition and viral hepatitis may be involved in the etiology of postnecrotic cirrhosis in Iran.

5269 SPONTANEOUS BACTERIAL PERITONITIS IN CIRRHOSIS: VARIATIONS OF A THEME. (E.) Conn, H. O. (VA Hosp. West Haven, Conn.) and J. M. Fessel. *Medicine (Baltimore)* 50(3):161-197, 1971.

Spontaneous peritonitis and bacteremia in 5 patients with alcoholic cirrhosis were reported previously. The pathogenesis was presumed to be contamination of preexisting ascites by transient bacteremia of intestinal origin, followed by sudden signs of acute sepsis when purulent peritonitis had developed. Based on analysis of 78 episodes in 70 patients, the typical case of spontaneous peritonitis in this study was characterized by fever, chills, abdominal pain, hypoactive bowel sounds, impending hepatic coma and shock. In atypical variations any of the above findings might be absent and normal ascitic fluid and sterile blood cultures may be present. The responsible organism need not be enteric in origin as almost 33% are gram-positive species from nonenteric sources. Overall prognosis is very poor, and is associated with only a 5% survival rate. Ascites is a very indicative sign of the syndrome and portal systemic shunting is important in prolonging bacteremia of any source. The similarity of the clinical picture of spontaneous peritonitis with that of primary peritonitis in childhood, of pneumococcal peritonitis of nephrosis and of tuberculous peritonitis implies a similar pathogenesis.

5270 TREATMENT OF ASCITES AND PORTAL HYPERTENSION BY DRAINAGE OF THE THORACIC DUCT INTO THE INTERNAL JUGULAR VEIN. I. (Ger.) Raschke, E. (U. Bonn Surg. Clin., Germany). *Bruns Beitr. Klin. Chir.* 218(5):403-414, 1971.

In 7 of 30 cadavers the thoracic duct split into 3 or more branches before entering the venous system: in 5 cases the thoracic duct did not enter the angle of junction between the left subclavian vein and the left internal jugular but entered the subclavian vein (2 cases), the internal jugular (2 cases), or both veins (1 case). In 1 cadaver the narrow branches of the thoracic duct united again and formed a trunk 1-cm long which opened into the angle of junction. None of the cadavers had dilated thoracic ducts although 2 had cirrhosis and ascites. Persistent ascites was induced experimentally in 6 of 30 dogs by constriction of the suprahepatic part of the inferior vena cava; anasarca developed in 3 of these 6 dogs. All of the 6 dogs with persistent ascites had anomalous, branched thoracic ducts identical with those found in cadavers; in the other animals the thoracic duct dilated to compensate for increased lymph flow. Ascites regressed in a few days and clotting factors, serum proteins, hemoglobin, and hematocrit values returned to normal after creation of anastomoses between the thoracic duct and the internal jugular vein (side-to-side in 3 cases, end-to-side in 3 cases).

5271 REVERSIBILITY OF BILIARY CIRRHOSIS DUE TO BILE DUCT OBSTRUCTION. (E.) Draz, S. (UCLA Sch. Med., Los Angeles, Calif.), L. Barajas and E. W. Fonkalsrud. *J. Pediatr. Surg.* 6(3):256-263, 1971.

Following common bile duct obstruction in 6 monkeys, there was a prompt and rapid alteration in liver function associated with hepatomegaly, marked elevation in portal pressure and an increase in circulating hepatic enzymes (acid phosphatase, alkaline phosphatase, SGPT). Monkeys cholecystectomized at the time of common bile duct ligation appeared to experience more severe alterations of liver function than those in which the gallbladder was not removed. A temporary return to normal values occurred following biliary drainage in a Roux-en-Y jejunal segment, but within 8 to 10 weeks there was a steady increase in the circulating hepatic enzymes levels and portal pressures which remained elevated until time of death 7 to 10 months following biliary reconstruction. Delay in diagnosis and relief of obstructive jaundice apparently results in progressive cirrhosis and portal hypertension.

5272 THE FREQUENCY OF MALLORY BODIES IN LIVER BIOPSIES FROM CHRONIC ALCHOLICS. (E.) Christoffersen, P. (Commun. Hosp., Copenhagen, Denmark) and K. Nielsen. *Acta Pathol. Microbiol. Scand.* [*A*] 79(3):274-278, 1971.

Mallory bodies were found in 29 of 287 (10%) liver biopsies taken from chronic alcoholics. Of these 29 biopsies with Mallory bodies, 18 showed cirrhosis with fatty infiltration and 11 showed fatty change and only suspicion of cirrhosis. Altogether there were 41 biopsies showing cirrhosis or suspicion of cirrhosis with fatty change; Mallory bodies occurred in 44% of these. Most biopsies with cirrhosis and Mallory bodies exhibited alcoholic hepatitis (83%). Alcoholic hepatitis was seen in most biopsies with fatty change without cirrhosis but with Mallory bodies (82%). The incidence of Mallory bodies and alcoholic hepatitis in consecutive materials of liver biopsies from chronic alcoholics appears to be 10% and 8%, resp.

5273 TREATMENT OF ASCITES AND PORTAL HYPERTENSION BY DRAINAGE OF THE THORACIC DUCT INTO THE INTERNAL JUGULAR VEIN. II. (Ger.) Raschke, E. (Univ. Surg. Clin., Bonn-Venusberg, Germany). *Bruns Beitr. Klin. Chir.* 218(6): 528-542, 1971.

A previously developed technique for anastomosing the thoracic duct with the left internal jugular vein was used to treat 24 patients (11 males and 13 females) with portal hypertension and, in some cases, drug-resistant ascites; portacaval shunt operations were contraindicated. All patients had esophageal and gastric varices, 22 had cirrhosis, 18 had severe ascites, and 10 had recurrent bleeding from esophageal varices; 2 had portacaval shunts which had thrombosed. Portal hypertension was caused by extrahepatic blocks in 2 patients (portal vein thrombosis in one and Budd-Chiari's syndrome in the other). Associated diseases included diabetes (3 patients), pulmonary tuberculosis (1 patient), and hemochromatosis (1 patient). After surgery 13 of the 24 patients died. The cause of death was hepatic coma (4), heart failure (3), massive recurrent bleeding (3), a metastasizing liver carcinoma (1), pulmonary atelectasis and cardiac arrest (1), and unknown causes (1). In contrast to results obtained on dogs, venous pressure increased significantly and serum protein and other liver function tests did not normalize after surgery in these patients. At surgery all 24 patients had anomalous, branched thoracic ducts; collaterals of the thoracic duct united to form a trunk which opened into the venous system in 5 patients who did not have ascites.

5274 HEPATIC AND PORTAL CIRCULATION AFTER PORTOCAVAL ANASTOMOSIS. (Fr.) Leger, L. (Cochin Hosp., Paris), J. P. Lenriot, J. P. Gorin and G. Lemaigre. *J. Chir. (Paris)* 100(6): 457-470, 1970.

5275 ETIOLOGICAL AND CLINICAL FACTORS IN HEPATIC CIRRHOSIS AND THEIR INFLUENCE ON COLLOID OSMOTIC PRESSURE AND ASCITES. (Sp.) Benages Martinez, A. (Sch. Med., Valencia, Spain), R. Peris Bonet, M. Tomas Ridocci and A. Pelaez Hernandez. *Med. Esp.* 64(381):366-372, 1970.

5276 CIRRHOSIS ASSOCIATED WITH MUCOVISCIDOSIS. (Fr.) Gaudier, S. (Albert Calmette Hosp., Lille, France), J. P. Nuyts and E. Bombart. *Lille Med.* 15(10):1391-1396, 1970.

5277 TREATMENT OF PRIMARY CIRRHOSIS OF THE LIVER BY DENERVATION OF THE HEPATIC ARTERY. (Pol.) Jacyna Onyszkiewicz, T. (Med. Acad. 1st Surg. Clin., Lublin, Poland), M. Jesipowicz and T. Hendzel. *Pol. Przegl. Chir.* 42(11):1641-1646, 1970.

5278 A CASE OF RENAL OSTEODYSTROPHY WITH INFANTILISM AND FATTY LIVER. (Sp.) Guillermo Fongi, E. (U. Buenos Aires Sch. Med., Argentina), G. Ganopol and L. Cooperberg. *Rev. Clin. Esp.* 119(4):361-364, 1970.

5279 DIFFUSE HEMORRHAGE OF THE GASTRIC MUCOSA ASSOCIATED WITH PYLETHROMBOSIS IN COMPLICATED CASES OF LIVER CIRRHOSIS. (Hun.) Kellermayer, M. (Med. U. Pathol. Inst., Pecs, Hungary). *Orv. Hetil.* 112(8):446-449, 1971.

5280 DETECTION OF ALCOHOLIC CIRRHOSIS OF THE LIVER BY IMMUNOLOGIC ESTIMATION OF IGA AND TRANSFERRIN. (Fr.) Aron, E. (Sch. Med., Tours, France), J. Lamy, J. Lamy and J. D. Weill. *Presse Med.* 79(8):357-358, 1971.

5281 THE STUDY OF PORTAL HYPERTENSION AS IT RELATES TO CHOICE OF OPERATION. (E.) Salam, A. A. (Univ. Sch. Med., Miami, Fla.) and W. D. Warren. *J. Fla Med. Assoc.* 58(2): 21-25, 1971.

5282 EFFECT OF ORNITHINE ALPHA KETOGLUTARATE ON THE RAISED BLOOD AMMONIUM LEVEL IN LIVER CIRRHOSIS. (Fr.) Michel, H. (St. Eloi Hosp., Montpellier, France), P. Oge and L. Bertrand. *Presse Med.* 79(19):867-868, 1971.

5283 THE CORONARY-CAVAL SHUNT IN PORTAL HYPERTENSION. (Ger.) Bürger, K. (Humboldt U. Surg. Clin., Berlin, Germany), R. Hübner, K. Janisch, W. Schimmelpfennig, K. Wagner and H.-B. Zimmermann. *Dtsch. Gesudheitsw.* 26(1): 14-17, 1971.

5284 URINARY EXCRETION OF THE ANTIKALIURETIC, TRIAMTERENE, AND ITS PHENOLIC METABOLITE, 2,4,7-TRIAMINO-6-p-HYDROXYPHENYLPTERIDINE, IN CIRRHOTICS AND SUBJECTS WITH NORMAL LIVERS. (Ger.) Andrasch, H. (Lubeck Med. Acad., Germany), T. Fink and E. Schmid. *Z. Gastroenterol.* 9(4):240-245, 1971.

5285 THE PRESENT STATE OF SURGERY OF THE THORACIC DUCT IN PORTAL HYPERTENSION. (Sp.) Manana Cattani, J. (Sch. Med., Montevideo, Uruguay). *Cir. Uruguay* 40(3):265-267, 1970.

5286 SURGERY OF PORTAL HYPERTENSION. (Sp.) Villagarcia, M. (Obrero Hosp., Lima, Peru), F. Piccone and A. Colan. *Rev. Med. Caja Nac. Seguro Soc.* 19(3):285-294, 1970.

See also numbers: 4698, 4703

GALLBLADDER AND BILIARY TRACT DISEASES

5287 GALLBLADDER DISEASE IN SOUTHWESTERN AMERICAN INDIANS. (E.) Nelson, B. D., J. Porvaznik and J. R. Benfield (1000 W. Carson St., Torrance, Calif.). *Arch. Surg.* 103(1):41-43, 1971.

A 2-year experience with gallbladder disease on the Navajo Indian Reservation in Northern Arizona is presented. Cholecystectomy was performed in 101 patients, (83 women and 18 men) with an average age of 44.9 yr. At operation 95 patients had cholecystitis (24 acute, 71 chronic) and 6 had cancer. The mortality among the 95 patients without cancer was 1.1% (1 death). Choledochotomy was carried out in 56 patients whose average age was 48.8 yr, common duct stones being found in 16 of these patients. The observed female-male ratio of 4.5:1 seems to agree with previously reported figures for Southwestern Indians being much higher than for nonIndian populations. Southwestern American Indians seem to suffer from gallbladder disease earlier in life than other Americans.

5288 PRESENCE OF AN INTACT CHOLESTEROL FEEDBACK MECHANISM IN THE LIVER IN BILIARY STASIS. (E.) Weis, H. J. and J. M. Dietschy (U. Texas Southwestern Med. Sch., Dallas). *Gastroenterology* 61(1):77-84, 1971.

Liver cholesterogenesis during biliary obstruction was studied in female rats to determine the reason for the enhanced rate of cholesterol synthesis seen in acute cholestasis. Rats fed a diet containing cholesterol and bile acid while the common bile duct was obstructed showed a decrease of 40 to 60% in liver cholesterogenesis. A 10-fold inhibition in hepatic cholesterol synthesis was observed following the i.v. infusion of 36 mg/day of cholesterol in intestinal lipoproteins. The inhibitory effect of cholesterol was through suppression at the level of β-hydroxy-β-methylglutaryl-coenzyme A reductase and was specific for liver cholesterogenesis. Hepatic cholesterol concentration, however, was increased following cholesterol administration. Thus, the increased rate of hepatic cholesterogenesis during biliary obstruction seems to be due to the interruption of the intestinal absorption of cholesterol.

5289 COMMON DUCT EXPLORATION WITH AND WITHOUT BALLOON-TIPPED BILIARY CATHETERS. (E.) Menzel, J. H. (U. Missouri Med. Ctr., Columbia) and M. S. DeWeese. *Arch. Surg.* 103(2):199-204, 1971.

Over a period of 20 months, 57 common duct explorations were performed on 54 patients. Twelve of 20 ducts explored by conventional instrumentation alone contained stones, while 13 of 24 ducts in which balloon catheters were employed as an adjunct had stones. There were no retained stones in the group of patients whose ducts were explored with the combined approach while 3 stones were retained using only the conventional technique. Complications occurring following use of the combined method included intrahepatic ductal narrowing, hematobilia, and cholangitis. However, 2 of the 3 instances of intrahepatic duct rupture, while led to the above ductal narrowing, were preventable and were not directly related to stone retrieval. The observation that all intrahepatic stones encountered in the catheter group were easily extracted supported adjunctive use of the catheters, particularly since one of the retained stones in the noncatheter group was in an intrahepatic duct. The overall value of balloon catheters outweighs the risk of morbidity.

5290 A RULER FOR ACCURATE MEASUREMENT OF THE COMMON BILE DUCT. (E.) Moore, A. R. *Surgery* 70(2):323-324, 1971.

A ruler is described which will measure the flattened diameter of the common bile duct at surgery. A metal handle 5 inches long joins a measuring plate (calibrated in mm to 30 mm) at an angle of about 45°. Measurement of the common bile duct is made 1 cm below the junction of the cystic duct by insinuating a finger behind the duct and pressing the ruler down onto it. It is suggested that if, at surgery, the flattened diameter is greater than 14 mm, exploration is probably required, while a diameter greater than 17 mm means that exploration is essential.

5291 VITAMIN A FOUR NIGHT-BLINDNESS IN PROLONGED JAUNDICE. (E.) Wright, J. M. (46 Grey Road, Walton, Liverpool, England) and J. S. Wright. *Br. Med. J.* 3(5766):92-93, 1971.

A single case is presented of a 67-yr-old male who presented with obstructive jaundice secondary to extensive adenocarcinoma of the cystic and common ducts and extending into the portal fissure in a manner obviating resection or bypass. By 13 months after laparotomy, he began to notice deterioration of night vision, was deeply jaundiced, had an enlarged firm, nodular liver and had a bilirubin of 19.4 mg/100 ml and a serum carotene of 10 μg/100 ml. After 8 daily injections of vitamin A, dark adaptation was markedly improved and within 2 weeks he was able to clearly distinguish objects in the dusk and to read newspring normally.

5292 URICOSURIC ACTION OF CHOLECYTSOGRAPHIC AGENTS. A POSSIBLE FACTOR IN NEPHROTOXICITY. (E.) Mudge, G. H. (Dartmouth Med. Sch., Hanover, N. H.). *N. Engl. J. Med.* 284(17):929-933, 1971.

After the administration of iopanoic acid in 9 patients undergoing cholecystography, the average ratio of uric acid to creatinine increased by 68% in the first 24-hr period, the rise being due to an absolute increase in urate excretion. During ipodate administration on consecutive evenings in a single and double dose, (3 and 6 g, resp.) for 6 days, creatinine excretion was constant, and a uricosuric effect approximately proportional to the dose was observed. Iodipamide, an intravenous cholangiographic agent frequently employed with oral agents, had a marked effect (increase) on urate output. The use of uricosuric drugs should be accompanied by a liberal intake of fluid and of alkalinizing agents, both measures increasing the solubility of urate by maintaining a low concentration of uric acid in the urine. A number of factors have been postulated as contributing to renal failure, the most important being the great frequency of reactions in patients who have received repeated or excessive doses, and in those with concomitant hepatic insufficiency. However, on the basis of the present evidence, the uricosuric action cannot definitely be implicated as the mechanism of nephrotoxicity, but it may be a contributing factor.

5293 EXPERIMENTAL CHOLELITHIASIS INDUCED IN MICE BY LARGE AMOUNTS OF CHOLIC ACID. (Fr.) Besancon, F. (Vaugirard Hosp., Paris), C. Marche and J. Parrot. *Arch. Fr. Mal. App. Dig.* 59(10-11, Suppl. 2):147-160, 1970.

This is the first report of cholelithiasis induced in virgin female Swiss mice by addition of cholic acid alone to their diet. Cholelithiasis was induced in 9 of 19 mice by 0.5% cholic acid and in none of 10 mice by 1% cholic acid; 8 of 10 mice in the latter group had large crystals of cholesterol in their gallbladders. Cholesterol alone (8%) did not produce cholelithiasis, but 0.5% cholic acid + 1% cholesterol induced cholelithiasis in 8 of 8 mice. Cholelithiasis developed in 1 of 15 mice given 0.25% dehydrocholate and in 13 of 17 mice given 0.5% dehydrocholate. Cholic acid (0.25%) + dehydrocholate (0.25%) induced cholelithiasis in 7 of 15 mice. Mice given cholic acid alone developed chronic cholecystitis. The increased concentration of cholesterol in the bile was caused by an increase in free cholesterol while increases in the cholesterol content of the gallbladder wall and liver were due to increases in esterified cholesterol. The triglyceride content of the liver decreased but the phospholipid content changed very little. When 0.5% clofibrate was added to the diet, only 1 of 9 mice given 0.5% cholic acid developed cholelithiasis in comparison to 11 of 19 controls who did not receive clofibrate. Clofibrate also protected against most gallbladder lesions, but it caused hypertrophy of the liver and did not prevent deposition of cholesterol crystals in the liver.

5294 SURGICAL ASPECTS OF BILIARY LITHIASIS.

(Sp.) de Juan y Martin, M. (Logrono, Spain). *Rev. Esp. Enferm. Apar. Dig.* 33(4): 497-524, 1971.

Of 286 surgically treated patients with biliary lithiasis, 251 (87%) had clinical symptoms and 35 (12.2%) were asymptomatic or had very mild symptoms. Results of surgery were good in 227 patients, satisfactory in 6, and poor in 6; no information is available for 47 patients. Residual stones were found in 5 patients (4 women and 1 man) 8-22.5 months after surgery and were located in the stump of the gallbladder (2), common bile duct (2), and ampulla of Vater (1). Of 279 patients for whom information was available, 63 (22%) had associated diseases, the most common of which involved the circulatory system (21), lungs (28), and liver (8). After surgery, medical complications occurred in 8 patients with associated diseases (12.6%) and in only 10 (4.6%) of those without such diseases, but the incidence of surgical complications was the same in both groups. Postoperative complications consisted of parietal abscesses (1), seromas (8), eventration (1), pancreatitis (3), gastrointestinal bleeding (1), hematobilia (1), and surgical trauma (2). In the postoperative period, 5 women died of a febrile syndrome, pancreatitis, arterial embolism, myocardial infarction, and heart failure (1 patient each).

5295 THE SOLUBILITY OF CHOLESTEROL IN AQUEOUS SOLUTIONS OF BILE SALTS AND LECITHIN.

(E.) Hegardt, F. G. (Polytech. Inst., Copenhagen, Denmark) and H. Dam. *Z. Erhaehrungswiss.* 10(3): 223-233, 1971.

The ability to dissolve cholesterol in 100 mM solutions of sodium salts of glycodeoxycholic acid, taurodeoxycholic acid, glycochenodeoxycholic acid, taurochenodeoxycholic acid, glycocholic acid and taurocholic acid, decreased in that order. The greatest difference between the different bile salts with respect to cholesterol-dissolving capacity occurred when no lecithin was present. In the presence of 2 different egg lecithins, in spite of their greatly different fatty acid compositions, no difference was observed between their ability to dissolve cholesterol. Using 50 or 200 mM bile salt solutions, differences in cholesterol dissolving capacity were not found when compared to 100 mM solutions. The graphical representation of the limit for solubility of cholesterol in a 100 mM solution of a mixture of the 6 bile salts in relative amounts as in human bile, to which lecithin from human bile was added, was practically identical to the corresponding curve for 100 mM solution of glycochenodeoxycholate.

5296 RADIOISOTOPE STUDY OF THE LIVER IN PATIENTS WITH ACUTE CHOLECYSTITIS.

(Rus.) Grigorian, A. V. (I. M. Sechenov 1st Moscow Med. Inst.), V. S. Vasil'ev, M. P. Rubin, D. M. Braginskii and V. A. Vert'ianov. *Sov. Med.* 34(3):8-14, 1971.

A comparison of liver function tests and liver scintigrams on 98 patients (80 women and 18 men, aged 35-80 yr) with acute cholecystitis demonstrated that the uptake of ^{131}I-labeled rose bengal by the liver was the most sensitive diagnostic method. Acute cholecystitis was associated with cholelithiasis in 79 patients and with obstructive jaundice in 22; 62 patients underwent surgery. In 30 patients with acute uncomplicated cholecystitis, liver function tests remained normal or showed only minimal abnormalities, scintigrams made with ^{198}Au were within normal limits, but moderate decreases in the uptake of ^{131}I-labeled rose bengal were found in 12 of 30 patients. Abnormal liver function tests were associated with liver dystrophy and chronic hepatitis. Liver function tests were significantly more abnormal in 46 patients with acute cholecystitis and symptoms of cholangitis, hepatitis, or pancreatitis. Uptake of ^{198}Au was normal in 25 and decreased in 21 patients, while uptake of ^{131}I-labeled rose bengal was normal in 24 and significantly decreased in 22 patients. Abnormal scintigrams were obtained from patients with hepatitis, hepatocholangitis, and cirrhosis. Cirrhosis was diagnosed in 3 of 7 patients whose spleens showed uptake of ^{198}Au. All 22 patients with acute cholecystitis and obstructive jaundice had hyperbilirubinemia and increased serum alkaline phosphatase activities. The uptake of ^{131}I-labeled rose bengal was decreased in all 22 patients, but the uptake of ^{198}Au was decreased in only 10 of 22. All of these patients had chronic cholangitis, 10 had liver dystrophy, 3 had hepatitis, and 3 had cirrhosis.

297 A VALUABLE ADDITION TO THE TECHNIC OF
OPERATIVE CHOLANGIOGRAPHY. (E.)
hitesell, F. B., Jr. (Arlington Hosp., Va.) and
. G. McWilliams. *Am. J. Surg.* 122(1):135-136,
971.

ollowing insertion of a cannula into the cystic
uct for a premeasured distance, a pneumatic
illow under the left flank is inflated thus ro-
ating duct structures away from the spine. Seven
c of contrast medium is injected and the patient's
espirations are suspended and the X-ray exposure
s made. To supplement this in obtaining a high
ower view of the ampullary area and distal common
uct, the duodenum was kocherized and a 2¼ by
inch dental film was slipped behind the
uodenum and head of the pancreas. Routine opaci-
cation was found in most of the proximal seg-
ent of the major pancreatic duct in all cases
n which this technique was used. Although this
ay be related to the kocherization maneuver,
o proof was obtained that this was the causative
echanism.

298 COPE'S SIGN, AND REFLEX BRADYCARDIA IN
TWO PATIENTS WITH CHOLECYSTITIS. (E.)
Reilly, M. V. (Norwalk Hosp., Conn.) and M. J.
rauthamer. *Br. Med. J.* 2(5754):146, 1971.

299 GALLSTONES AFTER PEPTIC ULCER SURGERY.
(E.) Field, E. S. (St. James, Hosp.,
ondon). *Br. Med. J.* 1(5751):708-709, 1971.

300 CHOLANGIOCARCINOMA ASSOCIATED WITH
BILIARY CIRRHOSIS. (E.) Stefanyk, H.
. Alberta, Edmonton, Canada) and N. S. Mann.
tiseptic 68(2):126-128, 1971.

301 NONTRAUMATIC PERFORATION OF THE COMMON
DUCT. (E.) Steinhoff, N. G.
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Tucker. *Am. J. Surg.* 121(3):334-337, 1971.

302 HYDRODYNAMIC OPERATIONAL RESEARCH ON
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p.) Loyarte, H. F. (Mar Del Plata Hosp.,
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303 HEMORRHAGIC CHOLECYSTODUODENAL FISTULA.
(Fr.) Detrie, P. (Maison Nanterre,
ance), P. Lasser and P. Eisenman. *J. Chir.*
aris) 100(6):471-478, 1970.

304 THE PATHOLOGIC ANATOMY AND HISTOCHEMIS-
TRY OF EXPERIMENTAL HEPATIC CHOLESTASIS.
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rfol. Norm. Patol. 15(6):513-520, 1970.

5305 COEXISTENCE OF CALCIFYING CHOLECYSTITIS AND PRIMARY CARCINOMA OF THE GALLBLADDER. (Pol.) Koszanski, E. (Med. Acad. 3rd Surg Clin., Lodz, Poland) and B. Serafin. *Pol. Przegl. Chir.* 42(6):836-838, 1970.

5306 OBSTRUCTION OF THE EXTRAHEPATIC BILE DUCTS. (Rus.) Magdiev, T. S. *Vestn. Khir.* 105(12):26-29, 1970.

5307 AN ELECTRON MICROSCOPIC AND RADIOAUTOGRAPHIC STUDY ON EXPERIMENTAL KERNICTERUS II. BILIRUBIN MOVEMENT WITHIN NEURONS AND RELEASE OF WASTE PRODUCTS VIA ASTROGLIA. (E.) Chen, H. (Natl. Taiwan U., Taipei), C. Wang, K.-W. Tsan and Y. Chen. *Am. J. Pathol.* 64(1):45-66, 1971.

5308 BILIARY PERITONITIS WITHOUT PERFORATION OF THE GALLBLADDER. (Rus.) Kulieva, K. D., A. S. Ibragimov and A. I. Ismailov. *Vestn. Khir.* 105(12):30-32, 1970.

5309 GALLBLADDER DISTENTION AND ISCHEMIA CAUSING "ABSORPTION" OF BILE ACIDS. (E.) Hall, R. C. (State U. New York Upstate Med. Ctr., Syracuse), J. T. Crosby, D. L. Fast and J. Tepperman. *Curr. Top. Surg. Res.* 3:439-451, 1971.

5310 CONTRIBUTION TO THE EVALUATION OF THERAPEUTIC PROCEDURES IN CHOLEDOCHOLITHIASIS. (Cz.) Bitter, J. (Reg. Hosp. 1st Intern. Med. Dept., Usti nad Labem, Czechoslovakia) and M. Hrbek. *Cesk. Gastroenterol. Vyz.* 25(5): 185-191, 1971.

5311 GALLBLADDER STONES IN PATIENTS WITH NEGATIVE GALLBLADDER X-RAYS. (E.) White, T. T. (Univ. Hosp., Seattle, Wash.). *Am. Surg.* 37(8):518-520, 1971.

5312 AN EXPLORING CATHETER IN THE COMMON DUCT. (E.) Leyse, R. M. (1041 116th NE, Bellevue, Wash.) and C. A. Griffith. *Am. Surg.* 37(8):506-508, 1971.

5313 SARCOMA BOTRYOIDES (RHABDOMYOSARCOMA) OF THE BILE DUCTS WITH SURVIVAL. (E.) Akers, D. R. (U. Colorado Med. Ctr., Denver) and M. E. Needham. *J. Pediatr. Surg.* 6(4):474-479, 1971.

5314 FATAL PANCREATITIS FOLLOWING BILIARY TRACT SURGERY ACCOMPANIED BY GASTRIC HYPERSECRETION: A CASE REPORT. (E.) Fieber S. S. (Montclair Commun. Hosp., Montclair, N. J.). *J. Abdom. Surg.* 13(2):33-37, 1971.

5315 CHRONIC CHOLESTATIC JAUNDICE IN INFANCY. (E.) Poley, J. R. (Univ. Med. Cent., Oklahoma City, Okla.). *J. Okla. State Med. Assoc.* 64(1):17-21, 1971.

5316 DIAGNOSIS OF A CHOLECYSTOCOLIC FISTULA BY SIGMOIDOSCOPY AND SERENDIPITY. (E.) Ianacone, J. A. (Gen. Hosp., Paterson, N. J.) and G. L. Becker. *J. Med. Soc. NJ* 68(3):215-218, 1971.

5317 LEIOMYOSARCOMA OF THE GALLBLADDER. (E.) Friedland, H. M. (United Hosp. Newark, N. J.). *J. Med. Soc. NJ* 68(3):205-211, 1971.

5318 CLINICAL INDICATIONS FOR ANASTOMOSIS OF THE BILIARY SYSTEM TO THE DIGESTIVE TRACT. (Pol.) Kortas, J. (Med. Acad. 2nd Surg. Clin., Stettin, Poland), M. Parszewski and W. Kaczmarek. *Pol. Przegl. Chir.* 42(11):1634-1637, 1970.

5319 MORPHOLOGICAL AND FUNCTIONAL CHANGES OF THE GASTRIC MUCOUS MEMBRANE IN CHRONIC CHOLECYSTITIS. (Rus.) Medvedev, V. N. *Klin. Med. (Mosk.)* 49(2):72-77, 1971.

5320 THE EFFECT OF BENZOHEXONIUM ON THE FUNCTIONAL STATE OF THE GALLBLADDER AND LIVER IN PATIENTS SUFFERING FROM CHRONIC CHOLECYSTITIS. (Rus.) Chernomorets, N. N. *Klin. Med. (Mosk.)* 49(2):42-46, 1971.

5321 EXPERIMENTAL EVIDENCE IN RATS ON THE PATHOGENESIS OF GALLSTONES. (E.) Ruderman, R. L. (U. Toronto Dept. Surg., Ontario, Canada), J. Blumenstein and D. Leask. *Curr. Top. Surg. Res.* 3:435-439, 1971.

5322 CHOLESTEROSIS OF THE GALLBLADDER AND CHOLECYSTITIS. (Rus.) Panchenkov, R. T. and V. A. Strusov. *Klin Med. (Mosk.)* 49(2): 55-58, 1971.

5323 AN UNUSUAL GASTRIC SITE FOR THE GALLBLADDER. (Fr.) Brizon, J. (C. H. R. Pathol. Anat. Lab., Bretonneau, France), H. Boraud, D. Medelsi and A. Benatre. *Presse Med.* 79(4):143-145, 1971.

5324 EXPERIMENTS ON THE CAUSE OF DEATH IN RATS AFTER PERMANENT AND TEMPORARY OCCLUSION OF THE PORTAL VEIN. (E.) Van Der Meer, C. (U. Amsterdam Pharmacol. Lab.), E. G. Faber and P. W. Valkenburg. *Proc. Kon. Akad. Wet.* [*C*] 74(2):76-91, 1971.

5325 CARCINOSARCOMA OF THE GALLBLADDER. (Ger.) Wolfensberger, C. (Canton Hosp., Winterthur, Switzerland). *Schweiz. Med. Wochenschr.* 101(9):335-338, 1971.

5326 THE POSTCHOLECYSTECTOMY SYNDROME. (Ger.) Koelsch, K. A. (Reg. Hosp., Magdeburg Alstadt, Germany). *Taegl. Prax.* 12(1):47-57, 1971.

5327 ANOMALIES OF THE PORTAL AND UMBILICAL VEINS. (Ger.) Rehder, H. (U. Bonn Pathol. Anat., Germany). *Virchows Arch.* [*Pathol. Anat.*] 352(1):50-60, 1971.

5328 STUDY OF THE DIFFERENT ACTIONS OF THE SPHINCTER AND THE DUODENAL PORTION ABOVE ODDI'S DUCT IN NORMAL SUBJECTS AND IN SUBJECTS WITH INFLAMED PAPILLA OF VATER. (Sp.) Cosco Montaldo, H. (Sch. Med., Montevideo, Uruguay) and L. Zubiaurre. *Cir. Uruguay* 40(1): 7-11, 1970.

5329 THE DIAGNOSIS AND PROBLEMS IN GALLSTONE ILEUS. REPORT OF THREE CASES. (Tur.) Uzer, F. (U. Ankara Med. Sch., Turkey), A. Yaycioglu, S. Gurpinar and I. Ceylan. *Tip Fak. Mec.* 23(4):1166-1175, 1970.

5330 OPERATIVE MANAGEMENT OF IDIOPATHIC CHOLEDOCHAL CYST IN CHILDREN. (Hun.) Hittner, I. (Semmelweis Med. U., Budapest). *Gyermekgyogyaszat* 22(1):45-48, 1971.

5331 GALLSTONE FORMATION SECONDARY TO A FOREIGN BODY. (E.) Morse, L. J. (St. Vincent Hosp., Worcester, Mass.) and J. Millin. *N. Engl. J. Med.* 284(11):590-591, 1971.

5332 PAPILLOMATOSIS OF THE AMPULA OF VATER. (Ger.) Blessing, M. H. (U. Dusseldorf Pathol. Inst., Germany) and W. Timm. *Zentralbl. Allg. Pathol.* 114(2):227-232, 1971.

See also numbers: 4707, 4715, 4722, 4873, 5121, 5154, 5297

5333 PRIMARY AND SECONDARY BILE ACIDS IN MECONIUM. (E.) Sharp, H. L. (U. Minnesota Health Sci. Ctr., Minneapolis), J. Peller, J. B. Carey, Jr. and W. Krivit. *Pediatr. Res.* 5(6):274-279, 1971.

Meconium obtained within the first 24 hr of birth was found to be sterile by aerobic and anaerobic culturing, but both thin-layer and gas-liquid chromatography showed the presence of primary and secondary bile acids. Although cholic and chenodeoxycholic acids predominated, deoxycholic acid was present in all pooled sample batches and lithocholic acid was found in 75% of them. No detectable secondary bile acids were found in stool samples from newborns after the first meconium passage until 5 days of age, at which time a few species of bacteroides were noted. The amount of lithocholic and deoxycholic acid were no more than 0.01 μg/g each. Gallbladder bile obtained from fetuses and unfed newborns who died in their first 24 hr contained more chenodeoxycholic acid than cholic acid. No secondary bile acids or free bile acids were detected. Taurine conjugates were found far in excess of those of glycine in all such samples. Only in bile from term infants was the amount of cholic acid similar to that of chenodeoxycholic acid, at which time the quantity of bile acids was increased, still with a predominance of taurine conjugates.

5334 GASTRO-INTESTINAL MANIFESTATIONS OF BURKITT TUMOUR. (E.) Ajayi, O. O. A. (Univ. Coll. Hosp., Ibadan, Nigeria). *Ghana Med. J.* 10(1):30-33, 1971.

Involvement of the gastrointestinal tract was seen in 25 of 66 (37.9%) patients with Burkitt's lymphoma, aged 4-15 yr. Only 57.6% of the 66 patients were males while gastrointestinal involvement was seen in 72% of the 66. Multiple sites of gastrointestinal involvement were seen in 25 (32%). Tumor deposits were seen in the stomach in 14 (56%), small intestine in 10 (40%) and colon in 9 (36%). No discrete lesions occurred in either the esophagus or rectum. Four major types of involvement were noted singly or in combination: mucosal plaques, which usually ulcerate; submucous deposits; intramural deposits; and serosal tags. Extra-abdominal deposits were seen in 13 (52), including the jaw (28%), thyroid (16%) and osseous and nervous systems. Of the 25, 21 (84%) showed evidence of other visceral deposits, especially of the liver (72%) and kidney (52%). The major mode of presentation consisted of abdominal mass (11), abdominal pain (5), jaundice (4), anemia (3), gross ascites (3), 2 each with peritonitis, diarrhea plus blood, intractable vomiting, and 1 each with gastric perforation, perforated appendix and profuse hemorrhage.

5335 DELIMITATION OF CLINICAL MATERIALS IN GASTROENTEROLOGY. (E.) Wulff, H. R. (Gentofte Hosp., Hellerup, Denmark). *Scand. J. Gastroenterol.* 6(Suppl. 9):31-36, 1971.

The complexity of problems relating to disease classification and delimitation of clinical materials which when given insufficient attention can limit the value of reports on the prognosis, therapy, and diagnosis of diseases, are discussed. Factors which are important in the delimitation of clinical materials include: theoretical definition of the disease, choice of diagnostic criteria, evaluation of the disease spectrum, and clinical stratification. Although an exhaustive account of the complex of problems relating to disease classification and the composition of clinical materials is not presented, the points discussed often decide the practical value of clinical investigations.

5336 ABDOMINAL PAIN ASSOCIATED WITH CELIAC ARTERY COMPRESSION. (E.) Charrette, E. P. (Queen's U. Dept. Surg., Kingston, Ontario, Canada), S. R. K. Iyengar, R. B. Lynn, G. B. Paloschi and R. O. West. *Surg. Gynecol. Obstet.* 132(6):1009-1014, 1971.

The literature is reviewed and 3 of the authors' 7 cases are very briefly reported. Six of the patients were symptomatic and complained of epigastric pain, postprandially in 4. This pain was often associated with a marked reluctance to eat, despite a normal or increased appetite, causing the severe weight loss seen in the 4 patients. Nausea and vomiting were usually not seen, but some presented with diarrhea. There usually is a localized systolic bruit heard over the epigastrium, and this is not transmitted to the distal aorta or iliac arteries. Biplane aortography, especially the lateral view, readily confirms the diagnosis, showing inpingement of the celiac artery take-off and, frequently, poststenotic dilatation. The primary causes of the syndrome are extrinsic compression of the celiac artery by the median arcuate ligament of the diaphragm or by neurofibrous tissue of the celiac plexus. Surgical decompression gave relief in all 6 of the symptomatic patients.

5337 INTESTINAL IMMUNOGLOBULINS IN SHIGELLOSIS. (E.) Reed, W. P. (VA Hosp., Albuquerque, N. Mex.) and R. C. Williams, Jr. *Gastroenterology* 61(1):35-45, 1971.

Immunoglobulin and agglutinating antibody concentrations were measured in diarrhea stool fluid in 14 patients with shigellosis and in 12 patients with acute shigella-negative diarrhea to determine whether intestinal immunoglobulins play a role in the apparent local immunity engendered by shigellosis in humans. The mean IgA concentration of 21 stools obtained from the shigella-positive patients was 221 ± 109 mg/100 ml fluid as compared to 71 ± 80 mg/100 ml fluid from 12 stools from the nonshigella group. Using sucrose gradients it was determined that most of fecal IgA is 11S. There was no significant difference between IgG and IgM concentrations between the 2 groups. Antishigella coproantibodies were higher in the shigella group and were identified as IgA in 2 patients, IgM in 3, mixed IgA and IgM in 2, mixed IgA and IgM in 1 and all 3 classes in 1. No differences in mean complement concentrations were observed.

5338 CHEMICAL FAECAL FAT USING SINGLE STOOLS. (E.) Walker, B. E. (St. James Hosp., Leeds, England), J. Kelleher, T. Davies and M. S. Losowsky. *Scand. J. Gastroenterol.* 6(3): 277-280, 1971.

Subjects consisted of 25 patients (9 with cirrhosis, 9 after partial gastrectomy, 4 with Crohn's disease and 2 with gluten enteropathy), hospitalized in a metabolic ward. Each patient received 0.5 g of chromium sesquioxide 3 times a day with meals for 4 days without stool collection and then for 7 days with collection of all stools. Each stool specimen was collected separately and all were pooled with the exception of a single one judged to be one of the heaviest. The weight of the single heavy stool was never more than 17% of the total and its fat content was analyzed separately but was added to the rest of the collection. Using this continual fecal fat marking with chromic oxide there was seen to be a correlation of 0.95 between fecal fats obtained from 47 single stool specimens and the respective 7-day collections, both results being corrected for the chromium content of the stool.

5339 LONGEVITY STUDIES FOLLOWING TOTAL GASTRECTOMY IN CHILDREN WITH THE ZOLLINGER-ELLISON SYNDROME. (E.) Wilson, S. D. (Wood VA Hosp., Milwaukee, Wis.), W. J. Schulte and R. C. Meade. *Arch. Surg.* 103(2):108-115, 1971.

Fifteen children with Zollinger-Ellison syndrome who underwent partial (8) or total gastrectomy (7) for the treatment of ulcer diathesis were studied. The mortality rate after less than total gastrectomy was 75% (6 of 8) with 5 dying from complications associated with recurrent ulcerations. Although all 7 of the patients undergoing total gastrectomy had metastatic and/or multiple tumors, all are alive (from 11 months to 12 yr after surgery). In 2 of 6 of these patients in whom gastrin levels were measured by bioassay of radioimmunoassay, serum gastrin levels remained elevated for 5 and 11 yr after surgery. Total gastrectomy, combined with tumor excision when possible, seems to be the preferred treatment for patients with ulcerogenic pancreatic tumors.

5340 EFFECTS OF ANTICHOLINERGIC DRUGS ON ZOLLINGER-ELLISON SYNDROME. (E.) Vaidya, A. B., B. Ashman, R. K. Goyal, S. M. Levine and T. Hersh (Baylor Coll. Med., Houston, Tex.). *Am. J. Dig. Dis.* 16(7):657-660, 1971.

The long-term therapeutic effects of anticholinergic drugs (medical vagotomy) on gastric acid secretion were studied in a patient with Zollinger-Ellison syndrome who had refused surgical therapy. There was a prompt decrease in both the basal acid output and maximal acid output after propantheline bromide (30 mg every 8 hr). The diminution in gastric acid secretion was paralleled by a disappearance of diarrhea and abdominal discomfort. After 6 months, failure of control of acid secretion with the anticholinergic agent occurred, and increasing the dose to 45 mg/8 hr was without effect. Treatment with glycopyrrolate (1-4 mg/8 hr) was partially effective in controlling gastric acid output and symptoms; however, this agent failed to be effective within 6 months. Severe gastric hypersecretion, dysphagia, and severe esophagitis necessitated total gastrectomy and esophagojejunostomy with the creation of a Hunt-Lawrence pouch.

5341 PANCREATIC ISLET HYPERPLASIA AS A CAUSE OF A SEVERE ULCER DIATHESIS. (E.) Hight, D. (Mem. Hosp., Worcester, Mass.), L. P. James and M. R. Jahadi. *Arch. Surg.* 103(1):98-100, 1971.

The case of a 53-yr-old man with duodenal ulcer who was treated by vagotomy and pyloroplasty and continued to show hyperacdity is presented. Serum gastrin levels were found to be 6 times normal; however, partial pancreatectomy and total gastrectomy was followed by a relief of symptoms and a decrease in circulating gastrin to twice normal. Examination of the resected pancreas revealed it to be normal at the gross level, but microscopic examination showed hyperplasia of the islets. In the gastric mucosa there was a striking increase in the number of parietal cells and recent hemorrhage into the lamina propria. This patient represents a rare case of the Zollinger-Ellison syndrome due to pancreatic islet hyperplasia and not a tumor.

5342 THE ZOLLINGER ELLISON SYNDROME (ZES). (Sp.) Nestor Cosen, J. *Rev. Asoc. Med. Argent.* 84(6-7):126-132, 1970.

5343 CONSIDERATIONS ON THE ZOLLINGER-ELLISON SYNDROME. (Fr.) Lefevre, B. (Gen. Hosp., Ottawa, Canada). *Arch. Un. Med. Balkan. (Bucur.)* 8(3):275-277, 1970.

5344 BOTULISM IN THE UNITED STATES, 1899-1969. (E.) Gangarosa, E. J. (Ctr. Dis. Control, Atlanta, Ga.), J. A. Donadio and R. W. Armstrong. *Am. J. Epidemiol.* 93(2):93-101, 1971.

5345 OUTBREAK OF FOOD-BORNE GASTROENTERITIS DUE TO A COAGULASE NEGATIVE ENTEROTOXIN PRODUCING STAPHYLOCOCCUS. (E.) Breckinridge, J. C. (Colorado Dept. Public Health, Denver) and M. S. Bergdoll. *N. Engl. J. Med.* 284(10):541-543, 1971.

5346 KEFLEX CEPHALEXIN MONOHYDRATE THERAPY IN BACILLARY DYSENTERY. (Jap.) Tanaka, E. (Municipal Ebara Hosp. Sch. Med., Tokyo). *Nippon Densenbyo Gakkai Zasshi (J. Jap. Assoc. Infect. Dis.)* 45(1):6-10, 1971.

5347 YERSINIA ENTEROCOLITICA SEPTICEMIA. REPORT OF A CASE. (Fr.) Picard, R., J. P. Chauvin and L. Marty. *Ann. Med. Interne* 122(2):215-218, 1971.

5348 ENTEROTOXIGENIC Escherichia coli ISOLATED FROM PATIENTS WITH SEVERE CHOLERA-LIKE DISEASE. (E.) Sack, R. B. (Johns Hopkins Univ. Ctr. Med. Res. Train., Baltimore, Md.), S. L. Gorbach and J. G. Banwell. *J. Infect. Dis.* 123(4):378-385, 1971.

5349 CLINICAL DYSENTERY, IN INFANTS AND YOUNG CHILDREN. EPIDEMIOLOGY DIFFERENTIAL DIAGNOSIS AND THERAPY. (Ger.) Breunung, M. (City Clin., Berlin-Buch). *Kinderaerztl. Prax.* 39(1):22-33, 1971.

5350 DIGESTIVE FUNCTION IN CHILDREN SUFFERING FROM DYSENTERY. (Rus.) Kuzmenko, V. V. *Sov. Med.* 34(1):120-124, 1971.

5351 TREATMENT OF AMEBIC COLIC. (Fr.) Blanc, F. (Marseille, France). *Acta Gastroenterol. Belg.* 34(3):298-300, 1971.

5352 THE CORRELATION BETWEEN HYPERGLYCEMIA AND ELECTROLYTE DISTURBANCES IN INFANTS WITH ACUTE GASTROENTERITIS. (Tur.) Abal, G. (U. Ankara Sch. Med., Turkey), G. Gurel and B. Demirag. *Tip Fak. Mec.* 23(4):1005-1014, 1970.

5353 LAXATIVE DISEASE. (Fr.) Dechavanne, M. *J. Med. Lyon* 52(1208):773-775, 1971.

5354 ETIOLOGY AND THERAPY OF DIARRHEA IN CHILDREN. (Ger.) Keller, H. (Christophorus Pediatr. Hosp., Berlin-Lichtenrade) and P. Keller. *Munch. Med. Wochenschr.* 113(8):269-274, 1971.

5355 ADENOVIRUS IN THE ETIOPATHOGENESIS OF ACUTE INFANTILE ENTERITIS. (It.) Rosaschino, F. (U. Milan Inst. Clin. Pediatr., Italy), F. Strozzi and M. Franchi. *Minerva Pediatr.* 22(49):2444-2451, 1970.

5356 CYSTS CAUSED BY THE DUPLICATION OF THE DIGESTIVE TRACT. (Rum.) Pana C. (1st Surg. Clin., Cluj, Rumania) and C. Moraru. *Rev. Med. (Tirgu Mures)* 16(3-4):439-442, 1970.

5357 MALFORMATIONS OF THE DIGESTIVE TRACT (EXCLUDING ANORECTAL MALFORMATIONS). GENETIC ASPECTS. (Sp.) Castilla, E., A. Rivarola and J. L. Massa. *Rev. Argent. Cir.* 18(3-4):212-220, 1970.

5358 A REVIEW OF GASTROINTESTINAL FISTULAE. (Sl.) Moravec, R. (Komenskeho U. Sch. Med., Bratislava, Czechoslovakia), V. Chorvath, J. M. Bencur and J. Simek. *Lek. Obzor* 19(11):595-604, 1970.

5359 REPAIR OF GASTROSCHISIS. (E.) Croom, R. D. (U. North Carolina Sch. Med., Chapel Hill) and C. G. Thomas, Jr. *Surg. Gynecol. Obstet.* 132(4):689-692, 1971.

5360 OMPHALOCELE - AN APPRAISAL OF THERAPEUTIC APPROACHES. (E.) Firor, H. V. (U. Cape Town Dept. Surg., South Africa). *Surgery* 69(2):208-214, 1971.

5361 WORKSHOP ON COMPARATIVE GASTROENTEROLOGY. (E.) Cornelius, C. E. (Kansas State U., Manhattan). *Am. J. Dig. Dis.* 16(4):368-380, 1971.

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he pathogenicity of true Entamoeba histolytica
s reviewed. Since amebiasis is generally limited
o the warmer regions of the world, virulent
solates generally originate overseas, while in-
igenous isolates in Great Britain are avirulent.
lthough amebae are dependent on bacteria for
heir growth in vitro and in vivo, altering the
acterial flora of isolates or adding pathogenic
acteria to in vitro cultures of amebae does not
lter the virulence. Continued cultivation in
itro invariably results in a loss of virulence
s shown first by a lower degree of ulceration
nd second by reduction of infectivity. The state
f the host also plays a part in determining the
eaction to infection with E. histolytica. Thus,
nvasiveness is an unstable character in these
arasites. Analysis of antigens has not revealed
ny clear-cut differences between virulent and
virulent strains. A lysosome active on the surface of the ameba has been identified and may be involved in the mechanism of invasion.

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